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Pulverizing Coal at Midvale Steel Works

A Large Plant, Conspicuous for Attention
to Safety Measures, for Preparing and
Transporting Fuel for Heating Furnaces

A coal pulverizing plant for preparing fuel for five continuous billet heating furnaces has been installed at the works of the Midvale Steel Company, Philadelphia. It is especially noteworthy not alone for the completeness of the equipment but for the numerous measures taken for safeguarding the employees. The following brief description of its main features may therefore be taken as a supplement to the article printed in *The Iron Age* of April 2 devoted to the safeguards and methods of promoting safety generally at the Midvale plant. The plant was installed by the Quigley Furnace & Foundry Company.

The pulverizing plant proper occupies a conspicuous building of the works, utilizing a triangular shape of ground not otherwise preempted between some of the tracks traversing the works. The furnaces which it was built to supply are in an adjoining building and the pulverized fuel has therefore to be conveyed overhead from the pulverizing or milling plant, as it is sometimes called, high enough to clear freight cars. The conveying system also comprehends a long pulverized-coal carrying system within the building for distribution to the furnaces. The plant is designed to treat 5 tons of bituminous coal per hour. The furnaces deliver heated steel billets weighing about 1200 lbs. each at a high forging temperature with continuous charging.

In Fig. 1 may be seen the milling building itself and the conveyor from this building to the building containing the furnaces, together with the pipe-railed walk installed as one of the safety features. Coal is delivered from cars into a concrete hopper 10 ft. wide and 20 ft. long, immediately underneath the coal-receiving track alongside the building. This hopper is built with 9-in. reinforced concrete walls, and there is a heavy galvanized pipe railing on each side of the hopper as a protection measure. The bottom of the hopper contains a 24-in. square opening which delivers to a reciprocating feeder passing the coal to a crusher. This is a two-roll machine with removable teeth, capable of crushing 12-in. lumps to $\frac{3}{4}$ -in. cubes, and has a rated capacity of 25 tons per hour.

The crushed coal is lifted by means of a bucket elevator to an 80-ton crushed coal bin, the top of which is shown in Fig. 2. The top of the elevating conveyor is shown at the right background and across the top may be seen the distributing or trimming conveyor from which the coal is dumped into the bin, as well as a 5-hp. motor driving the elevator and the trimming conveyor. The view also gives an insight into the large use made of galvanized pipe railings, which affords safe access to all parts of the plant—in this case the trimming conveyor as well as the head of the elevator immediately underneath the roof.

The crushed coal bin is supported immediately above the feeding end of the dryer, a large part of which may be seen in Fig. 3, including the bottom part of the bin. The dryer is one made by the Ruggles-Coles Engineering Company, and has a 54-in. shell 25 ft. long. It is driven by a 15-hp. motor, from which is also driven a mechanical exhaust fan employed in connection with the dryer as well as the pulverized coal feed for supplying the heat to the dryer. Fig. 4 shows the feeding end of the dryer, which is a revolving cylinder through which the coal to be dried travels by a gravity towards the discharging end while the cylinder is revolving, the cylinder being inclined slightly toward the discharge end, while the gases of combustion to supply the heat to accelerate drying travel from the feeding end and back again before being taken

by the exhauster and discharged into the atmosphere. The dryer is rated to treat 6 tons of crushed coal per hour, reducing the moisture content of a coal showing as high as 15 per cent. moisture to less than 1 per cent. Immediately above the feed end of the dryer may be seen the exhauster used in connection with the induced draft of the dryer, while at the right may be seen the individual pulverized coal bin provided for supplying the fuel for the dryer, the dryer being arranged to use pulverized coal except in emergency, when it may be fired by hand. An individual blower for supplying the air to the coal burner is shown also immediately over the combustion chamber. Toward the back of



Fig. 1—The coal milling plant is housed in a steel frame and steel sheathed building, on ground not otherwise specially required, and a tightly-closed screw conveyor carries the pulverized fuel overhead to the furnaces where it is used



Fig. 2—At the right, underneath the roof, may be seen the top of the bucket elevator lifting the crushed coal to the trimming conveyor distributing to the bin, which lies above the dryer. The extended use of pipe railing as a safeguard is indicated

Fig. 4 may also be seen the chute from the crushed coal bin to the dryer. This gets a supply from a helicoid conveyor at the bottom of the bin to provide a uniform supply of the crushed coal, and there are openings arranged with iron grids admitting to the conveyor from the bin.

From the dryer the coal is, of course, protected against contact with the atmosphere, so that it may not absorb any moisture after the precautions taken to rid the coal of it. Dryness of coal is, of course, essential in fine grinding, and the discharge from the dryer is through a fully enclosed chute to an elevator, which lifts it to an 18-ton so-called dry coal bin, supported above the crushing mills, of which there are two. These are pulverizing mills of the vertical type, with automatic feed, each of a rated capacity of $2\frac{1}{2}$ tons of bituminous coal per hour, when the coal is small enough to pass through a $\frac{3}{4}$ -in. screen.

There is, of course, a trimming conveyor over the dry coal bin, and the coal from the bin is chuted to each of the pulverizing mills, as indicated in Fig. 5. This shows the enclosed motors in the foreground, and shows also the pipe railing around the platform of the mill, as well as the pipe railing protecting the attendants from the belts from the motors to the mills. It also shows at the right a part of the system of channeled iron plates used for the various elevated walks. There is an automatic

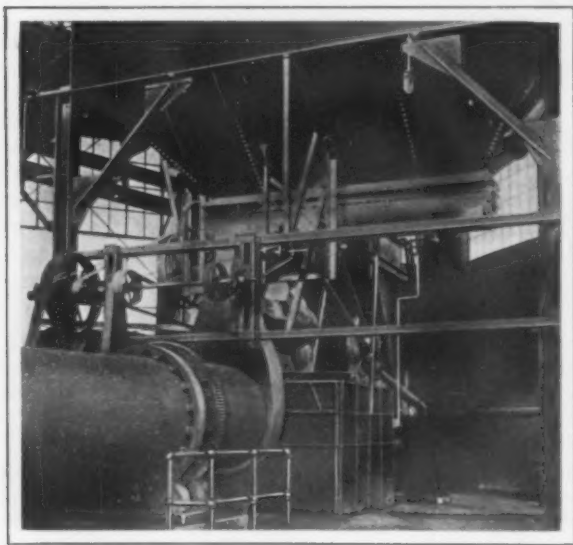


Fig. 3—The crushed coal is delivered in a steady quantity as desired into the rotary dryer, the feeding and combustion chamber end of which is shown. Although this makes only 6 r.p.m., it will be noted that the gearing is guarded

Richardson scale at the outlet of the pulverizers to weigh the coal on its way to a bucket elevator, which lifts the coal to an 8-ton pulverized coal bin above the milling plant, at the beginning of the conveying system by which the coal is transported to the furnace building. Each of the pulverizing mills is driven by a 40-hp. motor.

Some idea of the conveying system for the pulverized fuel may be gained from Fig. 6. There is one 9-in. main conveyor from the milling building, as shown in Fig. 1, this 75 ft. long and at an elevation about 30 ft. above the track rails. Within the furnace building it connects with another 9-in. conveyor, 305 ft. long, which lies roughly at right angles with the main conveyor, and which serves to convey and distribute the coal to the different furnaces. At the junction of the two conveyors is the 10-hp. motor for driving both of them. The conveyors are mounted in No. 10 sheet steel conveyor boxes with a top cover of No. 16 gauge steel, bolted in place with felt gaskets, to make absolutely dust-tight joints.

There are 10 discharge spouts from the long

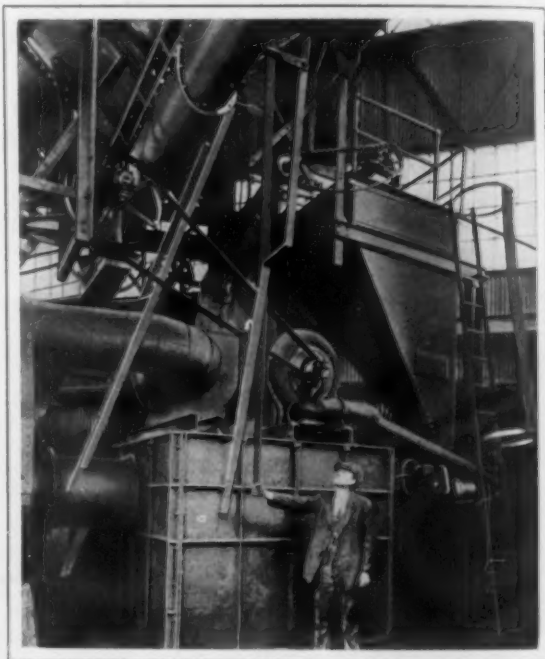


Fig. 4—At the right may be seen the pulverized coal hopper together with the small blower used in connection with the coal burner, as the dryer is arranged to utilize powdered coal, except in emergency. Above the combustion end may be noted the exhaustor used in connection with the dryer, and overhead is the conveyor for delivering the coal to the dryer. At the right may be seen one of the safety ladders conspicuous about the steel plant

conveyor, each commanded by a slide gate delivering to a lateral conveyor, shown in Fig. 6, and at the end of the line is a discharge spout to an overflow hopper, when the delivery is greater than the demand. This main conveyor lies behind the girder shown at the upper left of Fig. 6, and each lateral conveyor supplied by the discharging spout is 6 in. in diameter and driven by an individual motor on a small platform reached by the railed walk, overhead in the shop, also as indicated in Fig. 6. An automatic weighing scale is provided in each case, and a discharge spout delivers to a hopper at the furnace. The conveying system is supported in part on two 6-in. I-beam stringers carried on A-shaped supports and also from the roof trusses, and the construction includes the foot walks mentioned, paralleling the conveyors. These platforms, 18 in. wide, are provided with checkered plates, and with a pipe railing on each side. The safety ar-



Fig. 5—The coal from the dryer is lifted to a dried coal bin shown in the upper part of the view, from which spouts deliver to two vertical pulverizers, driven by the vertical motors shown in the foreground. Here the safety railing, even guarding the belts, is shown

rangements are as already stated, conspicuous for their completeness.

In Fig. 7 may be seen a pair of hoppers for a pair of burners at a furnace. Here may be seen the Culliney controller manufactured by the Quigley Furnace & Foundry Company. This is used to force the coal to the burner and to prevent the jamming or clogging of the coal. It contains two feeding screws, Fig. 8, the meshing gears driving which may be seen in the pictures, enclosed in gear guards.



Fig. 6—The pulverized fuel in the building where the furnaces are located is transported in an air-tight conveyor behind the girder. Paralleling is an overhead safety walk, giving access to the branch connections from the conveyor, where pulverized coal is weighed in individual automatic scales and delivered to pulverized coal bins below at the point of use

The upper screw carries the coal forward in the quantity desired, according to the speed of the $\frac{3}{4}$ -hp. individual motor used for driving it, and delivers it so that it may be blown to the burner by what is known as the controller air. This air amounts to about one-seventh of the total amount of air required for combustion, and is delivered at a pressure of 6 oz. Besides regulating by the motor speed the required quantity of coal in a given time, the size of the air orifice through which the controller air drives it is depended on also for regulation. The theory of the controller is that the sup-

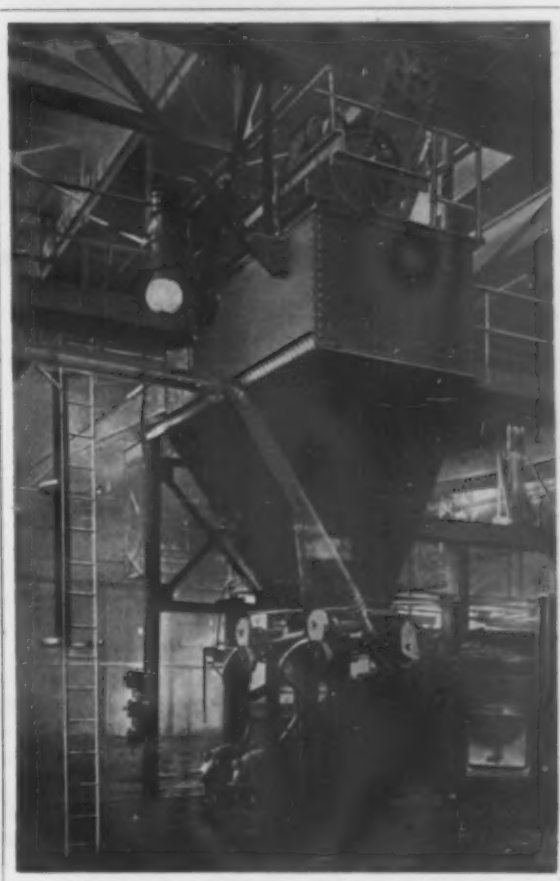


Fig. 7—The burner controllers, located at the bottom of the pulverized coal bins at the furnaces control the delivery of the fuel to the burner, and this view shows also the air pipes and one of the safety ladders

ply of air in picking up the coal mixes with it, so that the mixture expands into a well-divided cloud, ready for combustion when the secondary supply of air is met at the burner, supplied under a pressure of about $1\frac{1}{2}$ oz. The lower screw takes care of the excess coal which falls from the upper screw, and returns the overflow so that it may again reach the upper screw. Each of the bins at the furnace is designed to have approximately 14 hr. supply and the plant is designed to supply a 24-hr. amount of combustible with an ordinary day's operation of the milling plant.

Fig. 7 shows one of the safety ladders by which the foot walk may be reached, and another one of these safety ladders is shown in Fig. 4, both having the guard at the back of the ladder, which is intended to prevent the workman falling backward should he lose his footing. One other interesting point which makes for safety is the use of push button control. A push button may be used to stop any lateral conveyor and a push button is also supplied for remote control of the motors driving the main conveyors. Another important arrangement

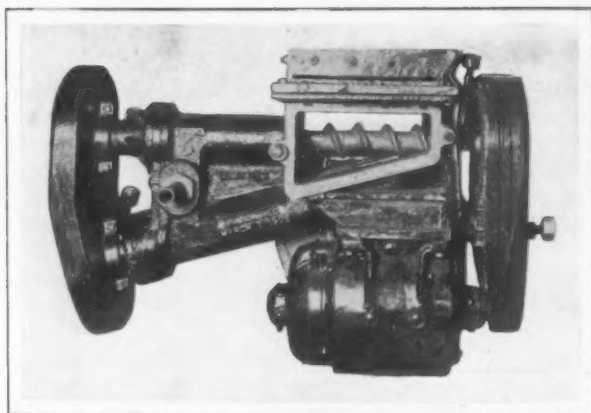


Fig. 8—A nearby view of the controller, with a cover plate removed, showing the upper screw. The screw delivers toward the left, the pulverized coal falls across the air pipe which carries it to the burner, and the coal which fails to be carried away is lifted by the inclined screw, so that it may be used over and over again, without clogging the flow of coal. Arrangements are being made to control the amount of fuel by a form of variable orifice in the air delivery pipe, in addition to regulating the speed of the controller motor.

is what may be termed a progressive control of the motors of the milling plant. This may be explained in a word by stating that the crusher cannot be started until the elevator to take the crushed product is in operation.

Multi-Purpose Ore Handling Bridge

Two ore handling bridges were recently installed by the Alliance Machine Company, Alliance, Ohio, at the plant of the Pittsburgh Steel Company, Monessen, Pa., for the rehandling of iron ore, which is brought to the plant in railroad cars from the Lake Superior district. The railroad cars are dumped at the edge of the stock pile by car dumpers which are not shown in the illustration. The ore bridges then remove the ore and place it in the various stock piles for the different grades of ore. The bridges also take the ore from the stock piles and load it into a transfer car from which it is delivered into the bins and from there to the skip hoist of the blast furnace. The length of the ore yard served by the bridge is 800 ft.

The bridges are of the latest type of construction and are arranged with a main trolley which travels along a runway located near the bottom chord of the bridge truss. They have a clear span of 162 ft. and there is a cantilever extension on each end of the bridges, one extension being 40 ft.

long and the other being 27 ft. The total height of the bridge from the stock rail to the highest point is 90 ft. Each bridge is equipped with a $7\frac{1}{2}$ -ton grab bucket, the bucket itself weighing $8\frac{1}{2}$ tons, making a 16-ton load for the bridge to handle. Each bridge is carried by 16 steel track wheels arranged in compensating trucks to distribute the load uniformly over all the wheels. The axles of the track wheels run in M. C. B. type bearings. The wheel base of the bridge is 48 ft.

A unique feature of this installation is the bridge driving arrangement, known as the double bridge drive. Each bridge is driven by two motors, one located on each side of the bridge truss and at the center thereof, and each motor drives an independent line of driving shafts geared up to the track wheels. This method positively drives all four corners of the bridge, and the ease with which the bridge starts up and with which it gets under speed is said to be very marked.

Under ordinary working conditions it is not the usual practice to move the ore bridge every time a bucket of ore is handled, as the bridge is usually placed over the stock pile and the transfer car brought up opposite and the ore transferred from the stock pile to the transfer car by using merely the trolley and hoisting motion. However, during an extended period there is a considerable time when the bridges must move quite a distance every time a bucket of ore is handled. Such operating conditions are met with when all the various grades of ore have to be dumped at one point and from there distributed to the various stock piles, and also when the transfer car is not in operation. These operating conditions have afforded an opportunity for quite a severe and successful test of the efficiency of the double bridge drive.

The bridge operator travels in the cab or cage attached to the trolley and all the controllers are located in this cage. The trolley is of all-steel construction and is carried by eight steel trolley wheels mounted on compensating trucks with M. C. B. type bearings. The bridges are built for high speed and are very heavily motored, the motor equipment being two 150-hp. motors on the closing lines and two 150-hp. motors on the opening lines for hoisting and lowering the bucket, two 75-hp. motors for the trolley travel and two 50-hp. motors for the bridge travel. The speeds are as follows: hoisting and lowering 320 ft. per min., trolley travel 1000 ft. per min. and bridge travel 150 ft. per min. All motors are of the mill type and the controllers are of the magnetic switch type.



Two Ore Handling Bridges at the Plant of the Pittsburgh Steel Company That Are Employed for a Variety of Purposes

The speed of the machine is shown by the fact that a full bucket of ore is hoisted 40 ft., the trolley moved 90 ft., the bucket emptied, the trolley returned 90 ft. to the starting place and the bucket lowered for another load of ore all in 40 sec. This speed is made under working conditions and not simply as a test. Under normal working conditions one bridge has handled 175 carloads of ore during one day's turn of 11 hr.

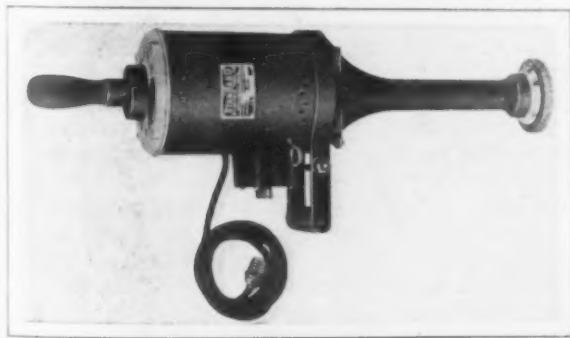
The bridge is equipped with various safety features, one of which is especially worthy of mention. This is a locking device operated from the cab on the trolley by electrical means and consists of a motor-operated device which, by a toggle motion, presses firmly on the runway rails and removes a large portion of the weight from the bridge truck wheels. It is impossible for the operator to leave the cab without locking the bridge to the rails, and similarly when he enters he must release the locking device, this making it absolutely safe against all accidents.

Another feature worthy of note is the repair trolley which is carried by the bridge truss and above the main trolley, the function of this being to facilitate repairs should any be required. The repair trolley is of sufficient capacity to handle the largest motor and any of the motors or mechanism on the main trolley can be removed or replaced in a very short time.

Universal Buffing and Grinding Machine

A new grinding machine of the aerial type has been placed on the market by the Standard Electric Tool Company, Cincinnati, Ohio. The machine is equipped with a universal motor and is designed to surface rough castings and for general buffing work.

The machine is driven by a $\frac{1}{2}$ -hp. universal motor which operates on either alternating or direct current circuits. It is particularly adapted for



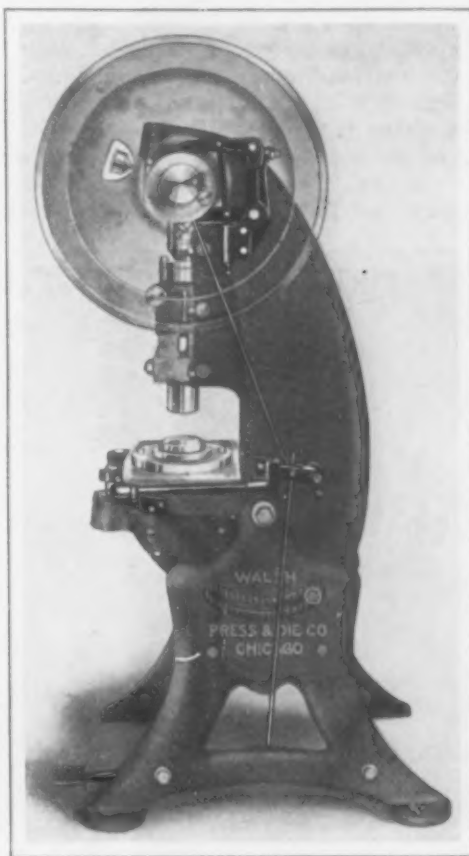
A Recently Developed Portable Aerial Grinding Machine for Surfacing Rough Castings Designed for Use on Either Alternating or Direct Current Circuits

circuits having frequencies as low as 25, 30 and 40 cycles. The motor is form wound and impregnated with Bakelite, this method of winding and insulation being relied upon to prevent short-circuits, grounds and other troubles incident to high-speed apparatus. The grinding wheel used is 4 in. in diameter with 1-in. face and operates at a speed of 6000 r. p. m. The tool is equipped with ball bearings throughout.

At Allentown, Pa., one of the two anthracite furnaces of the Allentown Rolling Mills is being torn down to make room for pump works. These furnaces have long been landmarks at Allentown. They were built in 1864 and originally were operated by the Roberts Iron Company.

Push-Button Safety Device for Presses

The Walsh Press & Die Company, 4707 West Kinzie street, Chicago, Ill., has developed a safety device for power presses in which it is necessary



A Press Equipped with a Push Button Safety Device Requiring the Operator to Have Both Hands Away from the Dies Before the Treadle Can Be Tripped

for the operator to have both hands away from the dies before the treadle can be tripped and the clutch of the machine released. It is claimed for the device that but little pressure is required to operate it, and that the distance between the buttons is such that both cannot be pressed with one hand, thus defeating the object of the device.

As will be noticed from the accompanying illustration, the buttons are located at the front of the press bed and must be pushed down like a typewriter key to release the treadle and enable the press to be operated. The position of the buttons and their size, it is pointed out, are such that the operator's hands naturally fall upon them after the work has been placed on the die, with the result that any slowing up of production due to the use of the device is almost entirely eliminated. The latch or haul-off is fully returned automatically at each stroke of the press. This arrangement is relied upon to prevent the operator from releasing the treadle with his foot sufficiently to have the clutch bolt drawn, thus keeping the latch at a hair trigger tension, which it is stated is almost invariably the direct cause of a press repeating or making a second stroke and inflicting injury upon the operator.

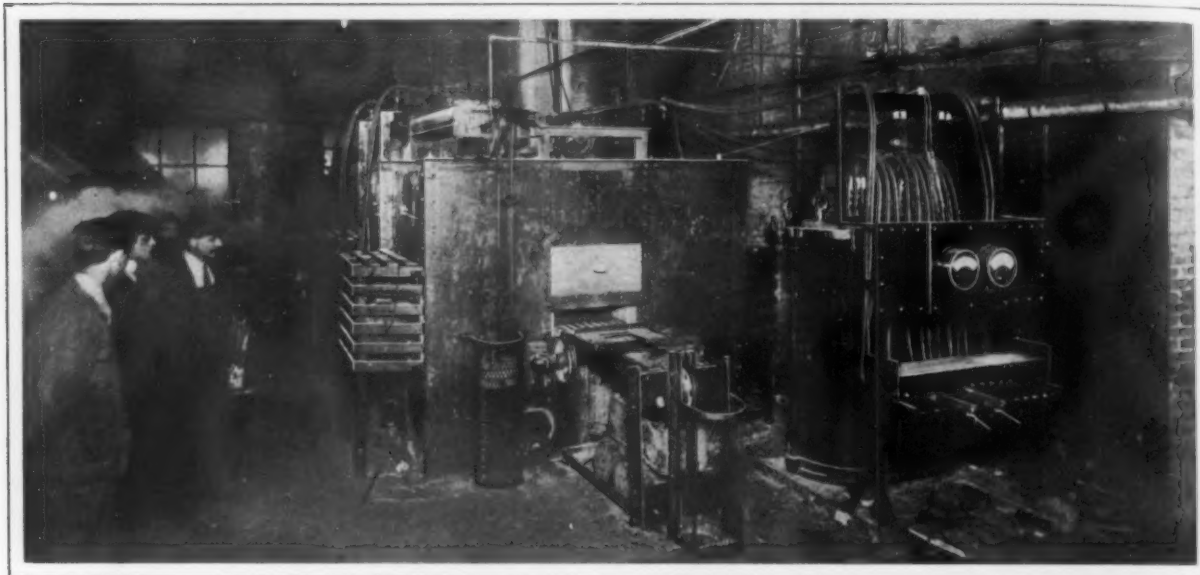
The device can be used on all sizes of press, the only difference being in the length of the tubes and the rod used. The feeding of strip stock in a press equipped with this device is possible, as the entire mechanism can be locked back at the discretion of the foreman, and if necessary one finger button can be locked, permitting one hand to be used in feeding.

ELECTRIC ANNEALING FURNACE

A Recent Development for Handling Brass and German Silver Flatware Blanks

The Electric Furnace Company of America, Alliance, Ohio, has designed and installed an interesting electric heating furnace in a plated table ware plant at Niagara Falls, N. Y. The special features of the furnace, which is designed for annealing brass and German silver flatware blanks, are a mechanical pusher for feeding the work into the furnace and the discharging of the completed

20 in. square, which are forced through the furnace one after another, seven being accommodated at one time. In their passage the pans are supported by a hearth of specially designed cast-iron grids, 24 in. square, which are relied upon not to warp unduly under the temperatures to which they are subjected. The pan coming out of the discharge end of the furnace is dumped automatically into a water sealed discharge hood, and the metal being treated falls into a tank of either clear water or one of pickling solution, the disposition depending upon the cleanliness of the material before it is charged into the furnace. The pan itself is caught by two rails and is held suspended above the trough,



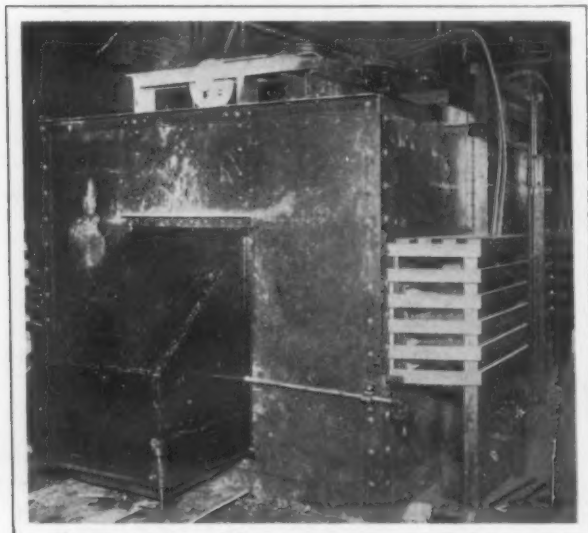
The Charging End of the Furnace Showing the Runway upon Which a Pan Containing the Flatware Blanks Is Placed

work through a water sealed hood. It is emphasized that desired temperatures are reached with precision and without danger of overheating, and also that the furnace atmosphere is always reducing and the material is discharged from the furnace quenched through a sealed hood.

The framework of the furnace is made up of structural steel shapes and plates, and doors are located at both ends of the furnace. The furnace is 15 ft. long, 8 ft. wide and 7½ ft. high. Compressed air cylinders operate a mechanical pusher running over cast-iron idler sheaves that in turn operate the pusher mechanism at the charging end. The material under treatment is packed in steel pans

and may be taken out from under the water sealed hood through the counterbalanced swing door shown in the view of the discharge side.

In the operation of the furnace a pan of flatware is placed on the runway in front of the pusher, as shown in the illustration of the charging end. The small hand lever near the top of the furnace frame is pushed upward and operates the air valve of the cylinder on the top of the furnace. The first movement of this cylinder raises both the front and rear doors sufficiently to admit the pans which are 3 in. high. When this has been done a stop on the cable holds the doors at this height, and the pusher with a pan of fresh material starts into the furnace, forcing the seven pans already in the furnace ahead of it. When the fresh pan is completely inside the furnace the one at the discharge end has been pushed clear of the furnace opening and door upon a dumping carriage. The weight of this pan striking the base of the carriage automatically tips the pan, which dumps its contents into a hopper, the lower end of which is submerged in the quenching tank. The pan, which is now in an inverted position, is caught by two rails and held above the water, being taken out through the counterbalanced swing door. The material as it is dumped into the quenching tank falls into a perforated copper basket that is removed at intervals. Simultaneously with the tilting of the pan dumping mechanism the pusher carriage is pulled out of the charging end of the furnace by the counterbalanced door, and as soon as it clears the opening the doors drop. It will thus be seen that the material is not exposed to the atmosphere at any time after it enters the furnace until it is taken from the quenching tank cold, an arrangement which is relied upon to elimi-



The Counterbalanced Swinging Door on the Discharge Side

nate the possibility of oxidization at any stage during the heating or cooling, as the furnace itself has a reducing atmosphere at all times.

The electrical equipment of the furnace consists of a special 200-kva. transformer, which was built by the Pittsburgh Transformer Company. It is arranged with 12 voltage taps, connected to a special controller, in such a way that a close regulation of the voltage and consequently the wattage can be readily obtained. This mechanism is mounted on the switchboard frame directly in front of the transformer, and a Weston wattmeter and a Foxboro pyrometer are also mounted on the board. The latter is connected with a 48-in. thermo-couple, placed directly over the pan about to be pushed out of the furnace. In this way, it is pointed out, the exact temperature at which the material is drawn can be determined.

A 12-In. Rotary Surface Grinding Machine

A grinding machine which is claimed to operate on an entirely new principle has been placed on the market by the C. G. Garrigus Machine Company, Bristol, Conn. It is designed for use in places where great accuracy is required, and it is emphasized that it will at the same time grind very rapidly. The range of work handled by the machine extends from very small pieces to anything that is not larger than 12 in. in diameter and not thicker than 8 in. The accuracy of the work is said to be within 0.0004 in. of the finished dimensions. The machine can be used for either wet or dry grinding, as may be desired.

The head is supported on a vertical oscillating column 41 in. long. This in turn is attached to a feed shaft, which is actuated by a pawl and ratchet, the head being lowered 0.00125 in. for the movement of each tooth on the ratchet wheel. The magnetic chuck is mounted on a spindle which is operated by a cone clutch pulley and is connected

to the cam that operates the wheel column through gearing, the stroke of the oscillating wheel being regulated by the adjustment of the cam roll. The movement of the head and the rotation of the chuck are controlled by the action of a lever at the side of the machine.

The following table gives the principal dimensions and specifications of the machine:

Diameter of grinding wheel, in.....	12
Face width of grinding wheel, in.....	$\frac{3}{4}$
Diameter of spindle driving pulley, in.....	$4\frac{1}{2}$
Face width of the spindle driving pulley, in.....	$2\frac{1}{8}$
Maximum distance between center of wheel and top of chuck, in.....	12
Vertical adjustment of head, in.....	8
Diameter of magnetic chuck, in.....	12
Height of chuck from floor, in.....	$41\frac{1}{2}$
Speed of countershaft, r.p.m.....	400
Weight of machine, lb.....	1,400

When the machine is equipped for grinding cast-iron pieces, such as piston rings, a special wheel covering with an opening for a flexible hose to carry away the dust of the grinding is furnished, as well as a special style of pan, which is more accessible for the operator for grinding single-piece work. When wet grinding is being done the water tank is connected with a pump, which affords a continuous circulation of water for the work on the chuck.

Steam Consumption of a Rolling Mill Steam Engine

A steam engine of 1700 mm. bore, 1400 mm. stroke (67 x 55 in.) and 100 to 130 r.p.m., installed for driving a three-high rolling mill, was recently tested with results as follows, according to Stahl und Eisen. The steam consumption was guaranteed by the manufacturers at 5.2 kg. (11.44 lb.) per i.h.p.-hr. at seven atmospheres gauge pressure at the engine and 300 deg. C. (540 deg. F.) superheat. After the engine had been in operation for about six months it was decided to determine its actual steam consumption, and to do this a brake test was undertaken, with the engine working for 3 hours at an average rate of output of 3000 h.p. This test was followed by a second test with a load of 1820 h.p. on the engine, which was required in order to establish how consumption varies with variations of load. The results follow:

	Test 1	Test 2
Average speed, r.p.m.....	97.8	102.0
Length of test, hr.....	3	1.5
Average pressure at the engine, atmospheres gauge.....	6.3	7.03
Steam temperature, deg. F.....	541.4	553.8
Vacuum, per cent.....	87.5	89.9
Average output, i.h.p.....	2982	1822
Steam consumption, as measured, without condensation, lb. per i.h.p.-hr.....	12.82	10.12
Steam consumption reduced to 7 atmospheres gauge pressure, 540 deg. F. superheat, 90 per cent. vacuum, without condensation, lb. per hp.-hr.....	11.66	9.9
Power consumption of the condenser plant, per cent.....	3.9	6.2

The Pennsylvania Railroad system, with 2554 all-steel passenger cars in service and 379 others under construction, owned more than one-third of all the steel passenger equipment cars in use in the United States on January 1, 1914. These figures are exclusive of sleeping and parlor cars. The number of all-steel passenger cars, other than Pullman cars, in service on January 1, was 7377. To replace with steel all wooden passenger cars now in use in the United States will cost about \$581,000,000. There were 2115 steel sleeping and parlor cars in service on all roads on January 1, 1914, and 750 of these were on the Pennsylvania system.

The Pennsylvania Public Service Commission has approved the application of the Lehigh & New England Railroad Company to purchase the capital stock of the Crane Railroad Company from the Empire Steel & Iron Company.



A New 12-In. Rotary Surface Grinding Machine Designed for Wet and Dry Work in Which the Wheel Oscillates over the Work

Results of Applied Scientific Management*

The Showing of Time Studies as a Means of Eliminating Useless Effort and of Establishing a Standard Practice in Operations

BY GEORGE DE A. BABCOCK†

Up to a very recent time professional time study has not effected any of the results obtained in the Franklin plant. Time for the control plan or premiums has been either estimated from previous performances or from coarse time studies. The conduct of the time studies and of the results accomplished under them, shown in Figs. 7, 8 and 9,

served, write down the different elements in the order in which they should be done before starting the study.

For convenience a stop watch graduated in minutes and decimals of a minute, the hands of which may be stopped and started without setting them back to zero, is used.

A special observation sheet is used with one wide column for the various elementary parts of the job,

OBSERVER'S NAME MORRIS MACHINE NO 59 V. DATE 2-11-1914
WORKMAN'S NAME TURNER #317
PIECE 19398-25 DIFFERENTIAL GEAR SECTION
STUDY A

OBSERVER'S NAME HAWKSWORTH MACHINE NO 105 V. DATE 3-30-1916
WORKMAN'S NAME THOMAS #334 734 8th AM
PIECE 19398-32 DIFFERENTIAL GEAR SECTION
STUDY B

DETAILED OPERATIONS	1	2	3	4	5	6	7	8	9	10	MINIMUM
1. Disengage from pinion bench											1.00
2. Pick up diff. band and lock it	15	16	17	18	19	20	21	22	23	24	1.00
3. Pick up diff. band and lock it	25	26	27	28	29	30	31	32	33	34	1.00
4. Pick up diff. band and lock it	35	36	37	38	39	40	41	42	43	44	1.00
5. Pick up diff. band and lock it	45	46	47	48	49	50	51	52	53	54	1.00
6. Pick up diff. band and lock it	55	56	57	58	59	60	61	62	63	64	1.00
7. Pick up diff. band and lock it	65	66	67	68	69	70	71	72	73	74	1.00
8. Pick up diff. band and lock it	75	76	77	78	79	80	81	82	83	84	1.00
9. Pick up diff. band and lock it	85	86	87	88	89	90	91	92	93	94	1.00
10. Pick up diff. band and lock it	95	96	97	98	99	100	101	102	103	104	1.00
11. Pick up diff. band and lock it	105	106	107	108	109	110	111	112	113	114	1.00
12. Pick up diff. band and lock it	115	116	117	118	119	120	121	122	123	124	1.00
13. Pick up diff. band and lock it	125	126	127	128	129	130	131	132	133	134	1.00
14. Pick up diff. band and lock it	135	136	137	138	139	140	141	142	143	144	1.00
15. Pick up diff. band and lock it	145	146	147	148	149	150	151	152	153	154	1.00
16. Pick up diff. band and lock it	155	156	157	158	159	160	161	162	163	164	1.00
17. Pick up diff. band and lock it	165	166	167	168	169	170	171	172	173	174	1.00
18. Pick up diff. band and lock it	175	176	177	178	179	180	181	182	183	184	1.00
19. Pick up diff. band and lock it	185	186	187	188	189	190	191	192	193	194	1.00
20. Pick up diff. band and lock it	195	196	197	198	199	200	201	202	203	204	1.00
21. Pick up diff. band and lock it	205	206	207	208	209	210	211	212	213	214	1.00
22. Pick up diff. band and lock it	215	216	217	218	219	220	221	222	223	224	1.00
23. Pick up diff. band and lock it	225	226	227	228	229	230	231	232	233	234	1.00
24. Pick up diff. band and lock it	235	236	237	238	239	240	241	242	243	244	1.00
25. Pick up diff. band and lock it	245	246	247	248	249	250	251	252	253	254	1.00
26. Pick up diff. band and lock it	255	256	257	258	259	260	261	262	263	264	1.00
27. Pick up diff. band and lock it	265	266	267	268	269	270	271	272	273	274	1.00
28. Pick up diff. band and lock it	275	276	277	278	279	280	281	282	283	284	1.00
29. Pick up diff. band and lock it	285	286	287	288	289	290	291	292	293	294	1.00
30. Pick up diff. band and lock it	295	296	297	298	299	300	301	302	303	304	1.00
31. Pick up diff. band and lock it	305	306	307	308	309	310	311	312	313	314	1.00
32. Pick up diff. band and lock it	315	316	317	318	319	320	321	322	323	324	1.00
33. Pick up diff. band and lock it	325	326	327	328	329	330	331	332	333	334	1.00
34. Pick up diff. band and lock it	335	336	337	338	339	340	341	342	343	344	1.00
35. Pick up diff. band and lock it	345	346	347	348	349	350	351	352	353	354	1.00
36. Pick up diff. band and lock it	355	356	357	358	359	360	361	362	363	364	1.00
37. Pick up diff. band and lock it	365	366	367	368	369	370	371	372	373	374	1.00
38. Pick up diff. band and lock it	375	376	377	378	379	380	381	382	383	384	1.00
39. Pick up diff. band and lock it	385	386	387	388	389	390	391	392	393	394	1.00
40. Pick up diff. band and lock it	395	396	397	398	399	400	401	402	403	404	1.00
41. Pick up diff. band and lock it	405	406	407	408	409	410	411	412	413	414	1.00
42. Pick up diff. band and lock it	415	416	417	418	419	420	421	422	423	424	1.00
43. Pick up diff. band and lock it	425	426	427	428	429	430	431	432	433	434	1.00
44. Pick up diff. band and lock it	435	436	437	438	439	440	441	442	443	444	1.00
45. Pick up diff. band and lock it	445	446	447	448	449	450	451	452	453	454	1.00
46. Pick up diff. band and lock it	455	456	457	458	459	460	461	462	463	464	1.00
47. Pick up diff. band and lock it	465	466	467	468	469	470	471	472	473	474	1.00
48. Pick up diff. band and lock it	475	476	477	478	479	480	481	482	483	484	1.00
49. Pick up diff. band and lock it	485	486	487	488	489	490	491	492	493	494	1.00
50. Pick up diff. band and lock it	495	496	497	498	499	500	501	502	503	504	1.00
51. Pick up diff. band and lock it	505	506	507	508	509	510	511	512	513	514	1.00
52. Pick up diff. band and lock it	515	516	517	518	519	520	521	522	523	524	1.00
53. Pick up diff. band and lock it	525	526	527	528	529	530	531	532	533	534	1.00
54. Pick up diff. band and lock it	535	536	537	538	539	540	541	542	543	544	1.00
55. Pick up diff. band and lock it	545	546	547	548	549	550	551	552	553	554	1.00
56. Pick up diff. band and lock it	555	556	557	558	559	560	561	562	563	564	1.00
57. Pick up diff. band and lock it	565	566	567	568	569	570	571	572	573	574	1.00
58. Pick up diff. band and lock it	575	576	577	578	579	580	581	582	583	584	1.00
59. Pick up diff. band and lock it	585	586	587	588	589	590	591	592	593	594	1.00
60. Pick up diff. band and lock it	595	596	597	598	599	600	601	602	603	604	1.00
61. Pick up diff. band and lock it	605	606	607	608	609	610	611	612	613	614	1.00
62. Pick up diff. band and lock it	615	616	617	618	619	620	621	622	623	624	1.00
63. Pick up diff. band and lock it	625	626	627	628	629	630	631	632	633	634	1.00
64. Pick up diff. band and lock it	635	636	637	638	639	640	641	642	643	644	1.00
65. Pick up diff. band and lock it	645	646	647	648	649	650	651	652	653	654	1.00
66. Pick up diff. band and lock it	655	656	657	658	659	660	661	662	663	664	1.00
67. Pick up diff. band and lock it	665	666	667	668	669	670	671	672	673	674	1.00
68. Pick up diff. band and lock it	675	676	677	678	679	680	681	682	683	684	1.00
69. Pick up diff. band and lock it	685	686	687	688	689	690	691	692	693	694	1.00
70. Pick up diff. band and lock it	695	696	697	698	699	700	701	702	703	704	1.00
71. Pick up diff. band and lock it	705	706	707	708	709	710	711	712	713	714	1.00
72. Pick up diff. band and lock it	715	716	717	718	719	720	721	722	723	724	1.00
73. Pick up diff. band and lock it	725	726	727	728	729	730	731	732	733	734	1.00
74. Pick up diff. band and lock it	735	736	737	738	739	740	741	742	743	744	1.00
75. Pick up diff. band and lock it	745	746	747	748	749	750	751	752	753	754	1.00
76. Pick up diff. band and lock it	755	756	757	758	759	760	761	762	763	764	1.00
77. Pick up diff. band and lock it	765	766	767	768	769	770	771	772	773	774	1.00
78. Pick up diff. band and lock it	775	776	777	778	779	780	781	782	783	784	1.00
79. Pick up diff. band and lock it	785	786	787	788	789	790	791	792	793	794	1.00
80. Pick up diff. band and lock it	795	796	797	798	799	800	801	802	803	804	1.00
81. Pick up diff. band and lock it	805	806	807	808	809	810	811	812	813	814	1.00
82. Pick up diff. band and lock it	815	816	817	818	819	820	821	822	823	824	1.00
83. Pick up diff. band and lock it	825	826	827	828	829	830	831	832	833	834	1.00
84. Pick up diff. band and lock it	835	836	837	838	839	840	841	842	843	844	1.00
85. Pick up diff. band and lock it	845	846	847	848	849	850	851	852	853	854	1.00
86. Pick up diff. band and lock it	855	856	857	858	859	860	861	862	863	864	1.00
87. Pick up diff. band and lock it	865	866	867	868	869	870	871	872	873	874	1.00
88. Pick up diff. band and lock it	875	876	877	878	879	880	881	882	883	884	1.00
89. Pick up diff. band and lock it	885	886	887	888	889	890	891	892	893	894	1.00
90. Pick up diff. band and lock it	895	896	897	898	899	900	901	902	903	904	1.00
91. Pick up diff. band and lock it	905	906	907	908	909	910	911	912	913	914	1.00
92. Pick up diff. band and lock it	915	916	917	918	919	920	921	922	923	924	1.00
93. Pick up diff. band and lock it	925	926	927	928	929	930	931	932	933	934	1.00
94. Pick up diff. band and lock it	935	936	937	938	939	940	941	942	943	944	1.00
95. Pick up diff. band and lock it	945	946	947	948	949	950	951	952	953	954	1.00
96. Pick up diff. band and lock it	955	956	957	958	959	960	961	962	963	964	1.00
97. Pick up diff. band and lock it	965	966	967	968	969	970	971	972	973	974	1.00
98. Pick up diff. band and lock it	975	976	977	978	979	980	981	982	983	984	1.00
99. Pick up diff. band and lock it	985	986	987	988	989	990	991	992	993	994	1.00
100. Pick up diff. band and lock it	995	996	997	998	999	1000	1001	1002	1003	1004	1.00
101. Pick up diff. band and lock it	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1.00
102. Pick up diff. band and lock it	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1.00
103. Pick up diff. band and lock it	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1.00
104. Pick up diff. band and lock it	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1.00

INSTRUCTION CARD									
DETAIL INSTRUCTIONS	STANDARD TOOL	CUTS		FEED	SPEED		TIME		
		NO.	DEPTH	AMT.	STROKES	P. M. MIN.	STROKES	PER	PIECE
PREPARED									
1	Change card at window							2.00	
2	Return to work							.50	
3	(Assemble Bevel Gear to Differential)								
4	Select Tools							2.00	
5	Take Diff. from bench, land in vise, tighten							1.5	
6	Wipe off grease, over Cap Screw & Flange							1.05	
7	Assemble Gear to Diff. (use punches 1939a (27))							.45	
8	Put Two 1/4 Cap Screws in Gear & Diff.							.17	
9	Start two nuts by hand (one at a time)							.33	
10	Tighten nuts with wrench							.25	
11	Loosen vise, land assembly on bench							.08	
12	Test holes for alignment (use rivet)							.40	
13	Remove assembly to tote box							.09	
14	Get card signed							2.00	
15	Take to window							.50	
16								7.00	
17	Allowances for rest & unavoidable delays							2.00	
18	Preparation							9.00	
19								2.97	
20	Allowances for rest & unavoidable delays							1.03	
21	Time per piece							4.00	
22									
23	Let size 37 X 4 (Time per piece)							1.48	
24	Preparation for lot							9	
25	Time for lot							157	
26	Premium							262	
WHEN WORK CANNOT BE DONE AS SHOWN, REPORT MUST AT ONCE BE MADE TO MAN WHO ISSUED THIS CARD.									
DATE 4/21/14 BY B.H.									
CASH, PULOTCA 1939B									
Assemble Bevel Gear to Differential									
406V Dm									

Fig. 8—Typical Instruction Card Informing Operator of the Different Operations Sufficient, Indicating Their Sequence, and Time Allowances

1—The quickest time desired for each elementary operation is the time that can be equalled only by the best workmen.

2—Whenever these elementary operations are of such a nature that they can be considered as standard, a record is made in such a way that they become a ready reference.

These elementary operations may occur in a great many different classes of work, and the percentage that is added for rest and unavoidable delays varies with the different conditions under which they are used. The percentage for rest and unavoidable delays is a very important item and is arrived at after exhaustive study.

Differential Gear Section, Fig. 7

Assembling bevel gear to the differential. In study A the operator had been given no instructions. Study B represents a study after the instructions had been given by time study man.

Operation 1, study A, was eliminated in study B, by having the material placed on the bench by a moveman. Operations from 3 to

10 in study A were combined in operation 2, study B. The man was instructed to do all burring with the differential clamped in vise after he had wiped off the grease. This eliminated loosening and tightening vise three times. In study A up to and including this operation the time consumed runs about 4 minutes, and in study B to this same point the time consumed was a little less than 2 minutes.

Operations 11, 12 and 13, study A, were merged into operation 3 in study B by using the punches referred to in second footnote on observation sheet. Operations 14 and 15, study A, were practically the same as 4 and 5 in study B. Time is saved by putting two cap screws at a time in piece. Operation 16 in study A and 6 in study B are similar. Time is saved in B by using a proper kind of wrench.

Instead of loosening vise, turning end for end, and tightening vise again as shown in operations 17 and 18, in study A, the man is instructed to loosen the vise and lay the piece on the bench as shown in study B. Operation 19, study A, is eliminated in study B, and is taken care of by operation 3. Note the use of the punches. For operation 8, no aligning is needed at this point; holes are tested for alignment with rivets only. Operation 20 in study A is done away with for the same reason as described above for operations 17 and 18. Operation 21, study A, is the same as 9, study B, but the time differs for the reason that the studies were taken of different men. Operation 22, study A, was eliminated for the reason that the man left his pieces on the bench and did not have to take them back to the bins. This was done by the movemen.

An instruction card, Fig. 8, is made out from study B on a form provided for the purpose. This gives the detailed instructions to the operator with the time for each itemized operation which makes up the assembly of the bevel gear to the differential. This is summed up and a percentage is added for rest and unavoidable delays and is the time allowed for each assembly. Besides this there is a certain amount of time allowed for preparation which is also itemized on this card and a percentage is added for rest and unavoidable delays. This instruction card is a permanent record of this method of assembly and is constantly referred to by all whom it may concern.

Steering Device Tube Case, Fig. 9

Drill for grease cup. A saving of time is accom-

OBSERVATION SHEET														
OBSERVER'S NAME Hawksworth MACHINE NO. T.D.S. DATE 1-14-1914														
WORKMAN'S NAME Burns #250														
AND QUALIFICATIONS Burns #250														
PIECE 18666 STEERING DEVICE TUBE & CASE														
Drill for Grease Cup														
STUDY 1														
DETAILED OPERATIONS														
A Pick up Tube & Case, land on 15	10	10	10	10	10	10	10	10	10	10	10	10	10	10
B Align Tube, locate drill 15	10	10	10	10	10	10	10	10	10	10	10	10	10	10
C DRILL 1/2" DIA. FEED 25	10	10	10	10	10	10	10	10	10	10	10	10	10	10
D Land Tube in box	10	10	10	10	10	10	10	10	10	10	10	10	10	10
TOTAL AVER. = 1.49														1.49
STUDY 2														
DETAILED OPERATIONS														
E Pick up Tube & Case, land on 15	10	10	10	10	10	10	10	10	10	10	10	10	10	10
F Align Tube, locate drill 15	10	10	10	10	10	10	10	10	10	10	10	10	10	10
G DRILL 1/2" DIA. FEED 25	10	10	10	10	10	10	10	10	10	10	10	10	10	10
H Land Tube in box	10	10	10	10	10	10	10	10	10	10	10	10	10	10
TOTAL AVER. = .591														.591

Fig. 9—An Illustration of the Value of Specific Instructions in a Bench Drilling Operation and of the Study to Minimize Effort

plished by the time study man by having the material placed in a convenient place, and also instructing operator how work should be placed on machine. In study 1 the man had no specific instructions.

In operation B he put his piece on the V-block as shown by the dotted line, standing in front of machine at position Y. To align the piece to the drill he had to step to position X, then back to Y to operate machine.

In study 2 he was instructed to put his piece on machine as shown in full line and this enabled him to align the piece without moving from position Y. Owing

cents to 29 cents before time study had been started and the increase of rates from 26 to 29 did no more than increase the cost of the product, as will be noted by the cost curve. The time studies corrected this, and it is well to know that the time studies were corrections of effort rather than increase of speed. The speed attained was due primarily to the fact that the workmen always made the same and most efficient effort in the same way, and of course by practice it necessarily became eas-

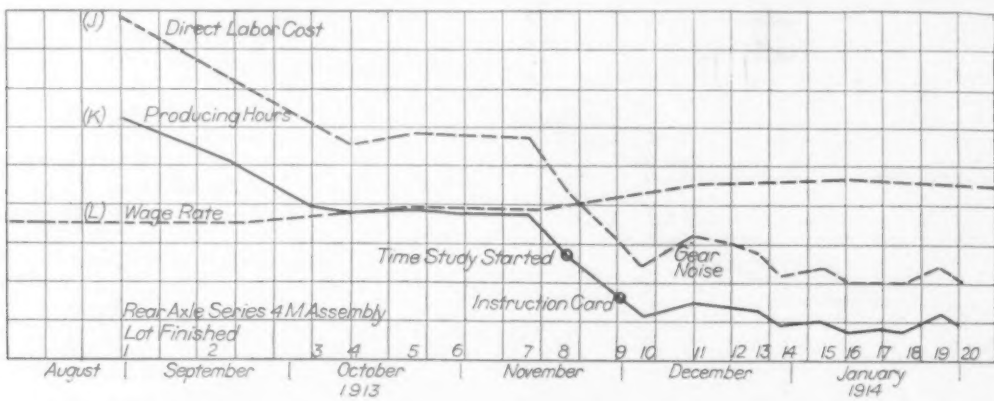


Fig. 10—By the Application of Time Studies the Effort Involved Is Minimized, as Here Indicated by the Less Time Required to Deliver a Lot of Rear Axles Assembled, at Approximately Half Original Cost and Yet Higher Wage Rates

to the fact that the operator did not have to move his position he was able to work to better advantage with the result that he cut his time almost in two.

The conclusions which the author has reached as to the effect of time study on costs is shown in Figs. 10 and 11. Fig. 10 will show the effort on the rear axles with respect to cost, producing hours, labor rate and also the influence of time study upon the certainty and uniformity of total productive effort. The numbers at the bottom of the sheet show lots finished and are plotted on a time sheet under the date at which each lot was finished. The lots are all of the same size.

It will be noticed that direct labor costs dropped

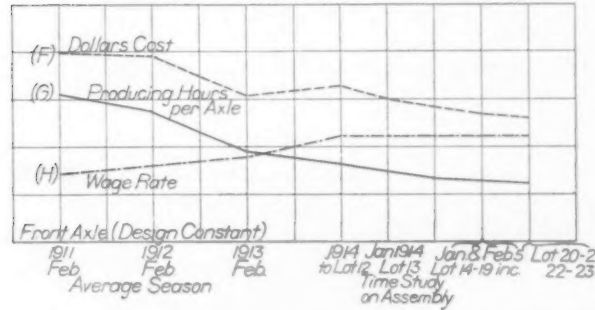


Fig. 11—What Has Been Accomplished by Time Studies Shown in the Case of Front Axle Assemblies in Comparison with Former Averages

rapidly from lots 1 to 4, then maintained a steady period for lots 4, 5, 6 and 7; dropped again at 8 at which time study was started; dropped again at 9, when the men worked under their first instruction cards. The labor costs rose again due to noisy gears, which required a considerable amount of extra labor, and settled again to practically a constant figure, approximately one-half of the original steady cost. The frequency with which the lots were finished increases rapidly as the cost and producing hours per lot is lowered.

Eight workmen to a group are employed continuously on this axle assembly and the rate of increase of workmen's earning as shown is the average for the men in one group. This shows a rise of 26

ier and more rapid. Making a quick decision as to quality of noise furnished one man 33 per cent. increase in wage.

Fig. 11 is a study of time, cost and wage rate on a large assembly, the front axle. This in design and productive effort has remained practically constant over the periods as shown. The points plotted for 1911, 1912 and 1913 are the averages for the whole year's work. The marked drop between 1912-13 in cost and producing hours will on inspection be found to agree with the average drop in producing hours per car over the same period as shown in Fig. 3, and illustrates as mentioned previously the effect of the control plan with lot production. The 1913-14 increase of cost is due to increasing the rate of labor, and from 1914 on the gradual decrease is due to results of time study; the rate per hour of labor in the meantime increasing.

(To be continued)

The First Bessemer Rail

On the authority of Edward Riley, chemist for the Dowlais Iron Works, England, the following analyses of the first Bessemer rail produced, as well as the pig iron from which it was made, were given in a communication by him to the London Iron and Coal Trades Review under date of March 21, 1898. They are incorporated in a recent elaborate article by Ernest F. Lange on "Bessemer, Göransson and Mushet: a Contribution to Technical History" in the same paper, May 8, 1914:

First Bessemer Rail Rolled		Per cent.
Carbon	.....	trace
Silicon	.....	trace
Sulphur	.....	0.235
Phosphorus	.....	0.516
Arsenic	.....	nil
Manganese	.....	nil
Copper	.....	nil
Iron	.....	99.249
		100.000
Pig Used for First Bessemer Rail		
Carbon	.....	3.40
Silicon	.....	1.36
Sulphur	.....	0.07
Phosphorus	.....	0.29
Manganese	.....	0.23

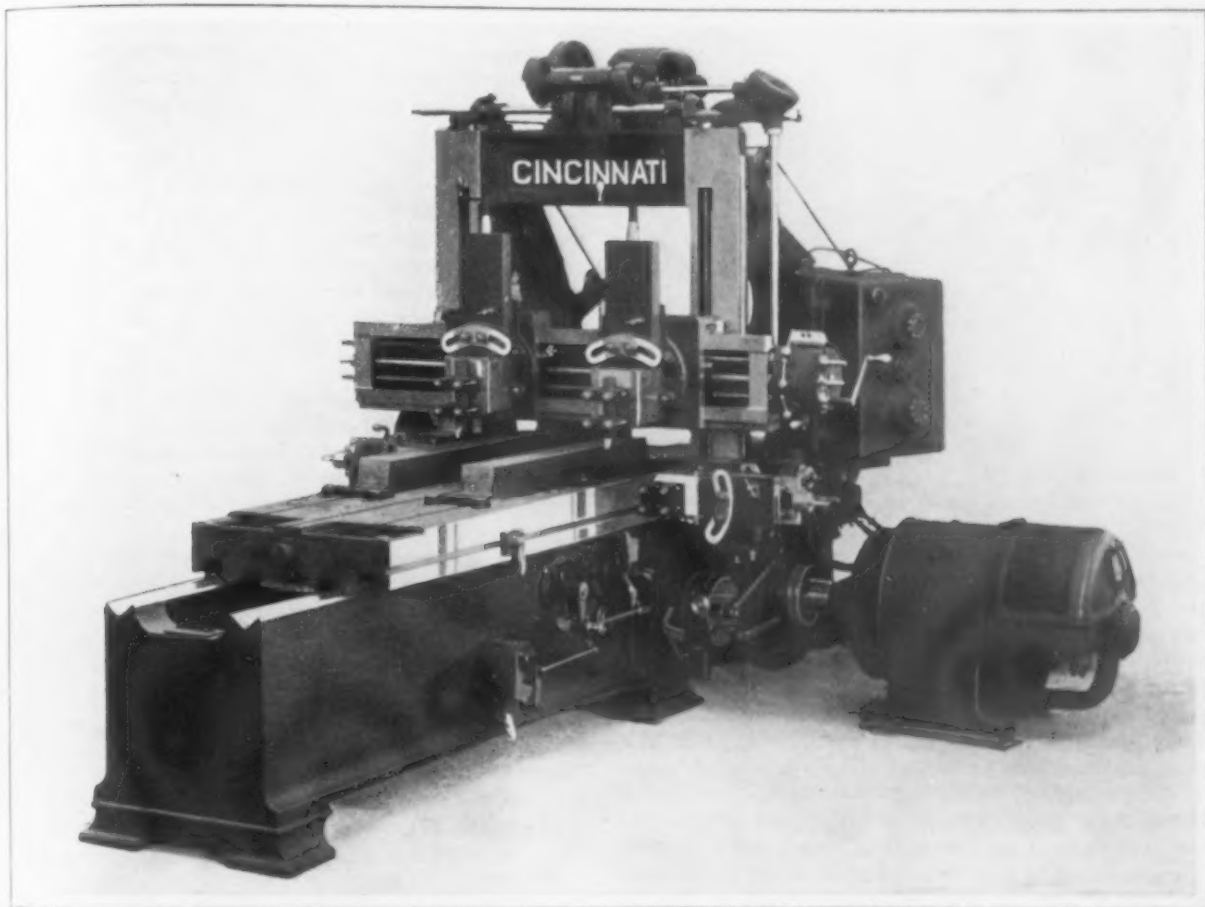
The high sulphur and high phosphorus in the rail are noteworthy.

A Four-Head Planing Machine

At the exhibit of machine tools recently held at Atlantic City in connection with the convention of the Master Car Builders' and Master Mechanics' associations, the Cincinnati Planer Company, Cincinnati, Ohio, showed a heavy pattern planing machine. It is equipped with four heads and a reversible motor drive, which provides 10 cutting speeds, ranging from 25 to 60 ft. per min. and the

the one just under them engages the rapid power traverse, the movement of the head being in the same direction as that in which this handle is moved.

The machine is equipped with steel gears and racks throughout and is said to be capable of taking heavy cuts at high speeds. The housings extend to the bottom of the bed, where they are securely bolted, doweled and locked in position by two large keys. Taper gibs are employed through-



A Heavy Pattern Planing Machine Equipped with Reversible Motor Drive Providing Cutting Speeds Between 25 and 60 Ft. and a Maximum Return Speed of 100 Ft.

same number of return speeds, the maximum one being 100 ft. The machine will handle work up to 36 in. square and 8 ft. long. One of the particular features about the machine is the rapid power traverse that is provided for the heads.

The motor at the top of the arch delivers power through spur gears to the rail elevating device and then to the horizontal rapid traverse shaft at the top. This shaft has a bevel gear meshing with one on the vertical rapid traverse shaft at the side of the housing, which in turn transmits its power to a pair of spur gears at the end of the rail. The regular feed is transmitted to the heads from the friction on the end of the pinion shaft to the trigger or feed gears at the end of the rail by a gear segment and rack in the usual way. The feed and rapid power traverse gears on the rail screws and the rod are free to revolve until clutched by a spool between them which has a neutral position in which neither one is engaged. In this way, it is pointed out, both the rapid power traverse and the feed cannot be engaged at the same time. Provision has been taken to protect the mechanism against all accidents. The clutch spools are controlled by three handles at the end of the rail, while

out for the rail and side heads and the former have micrometer readings in any direction. All of the gears are covered with guards to prevent accidents to the operator.

New Illinois I-Beam Sections

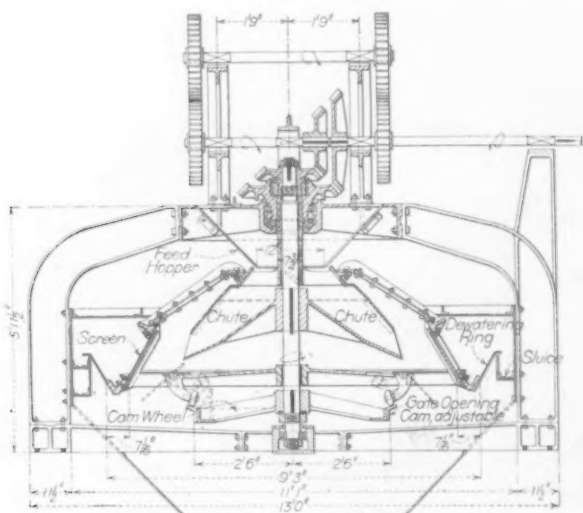
The Illinois Steel Company, Chicago, in line with the demand for better economy in the use of structural steel work for buildings and bridges, has designed and is rolling a new series of I-beam sections, which are illustrated and described in a booklet entitled "Special Light Structural Beams." The company is now prepared to offer these beams to the steel trade and can make deliveries with the same facility as in the case of all others of its standard sections.

Reference to the booklet will show that a slight departure has been made in the matter of depth from the range of the so-called American standard I-beam sections, in the introduction of a beam of 21 in., thus making the depth variation in the light beam series somewhat more uniform. The statement is made that, as these latter sections are thoroughly practical and readily available, it will be found that by their use great economy in design can be secured, and in consequence the employment of fireproof construction can be considerably extended.

A CONTINUOUS COAL DRIER

An Ingenious Automatic Machine Employing Gravity and Centrifugal Force

For drying coal after washing, the Link-Belt Company, Chicago, Ill., has brought out an automatic machine which is continuous in operation. It automatically receives and discharges the material



An Automatic Mechanism for Drying Coal After It Has Been Washed

and moisture it handles. While, as has been stated, the performance of the machine is continuous, the drying action is intermittent. Centrifugal force and gravity are utilized in the operation, and no scraping or plowing devices are needed. This arrangement, it is emphasized, eliminates excessive wear and also reduces the power consumption to a comparatively low figure.

The machine, which is self-contained, consists of three main parts, the frame, the feed spouts and the container, together with a sluice and a hopper. The feed spouts are fastened to an inner solid shaft and are driven by transmission system at any desired speed independently of the container. This arrangement and the relatively low speed of the revolving elements in relation to each other tend to subject the working parts to but little wear. The container is driven through a hollow shaft and consists of a top plate, a bottom plate provided with openings, which are closed by trap doors and an outer inclined wall, the last being made up of perforated screens. These screens, which take the wear caused by the sliding of the material when the doors are open, can be readily replaced by simply cutting them loose and riveting new parts to the iron frame. A water collector is located outside the screen and is arranged so that the water, which is thrown through the screen, is collected and compelled to follow the sloping sides to the top edge, where it is discharged by centrifugal force into a sluice and led away.

The speed of the container is independent of the feed spouts. The easy discharge of the material being dried is accelerated by placing the screen at a slope, so that when the coal is sufficiently dry and the doors in the bottom are opened, the material will slide downward and out into the hopper. Centrifugal force is utilized to make this operation practically instantaneous. The sliding doors in the bottom of the container are opened and closed automatically by cams attached to the revolving shaft on which the feed spouts are fastened. The ma-

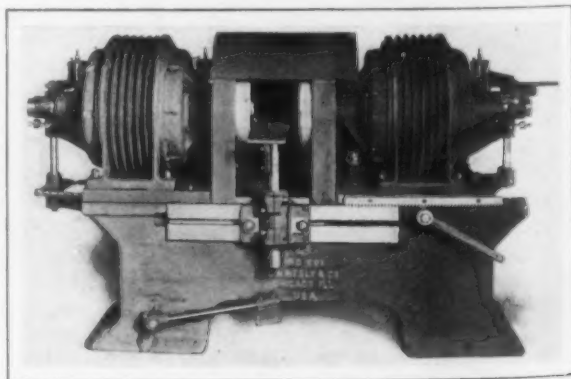
terial which is being dried is discharged continuously and automatically from the container after it has remained in the machine long enough to secure the desired degree of dryness.

After the machine has been put in motion and has been brought up to its full speed, the material to be dried is fed into the spouts. Under the action of centrifugal force the coal is thrown in a steady stream against the perforated screens forming the outside of the container. As the spout travels faster than the drying screen a thick bed is formed on the inner surface of the container. By reason of the more rapid travel of the spouts, they gradually gain on the container, and the discharge doors are manipulated so as to prevent material from being discharged into the portion of the container that is being emptied. The opening and closing of these doors is regulated by a set of cams which, it is pointed out, are always in the same fixed relation to the spout, as they are fastened to the same shaft and travel at the same speed. In this way there is always an empty section about the size of a door opening just ahead of the spout and just behind the cam, the distance between the cam and the spout being large enough to permit the door to be gradually opened and closed before the material discharged from the spout can reach that section. The empty space is filled and the material which is being dried is compelled to stay in position until the cam again opens and closes the door, the empty space being refilled from the spout which follows close behind.

This performance is repeated and the material handled is thus compelled to remain a sufficient length of time for the moisture to be driven off. This period can be varied by changing the speed relation existing between the cams and the spout with reference to the container. Another method of securing a similar result for adjusting the dryness of the material is by regulating the feed.

A Double Ring Wheel Grinding Machine

Charles H. Besly & Co., 118 North Clinton street, Chicago, Ill., have developed a double-spindle direct-connected motor-driven ring wheel grinding machine. This machine brings the two grinding wheels, which are 21 in. in diameter, in contact with the work, thus grinding two parallel surfaces simultaneously. Although the machine is used to a large extent by manufacturers of wrenches, it can nevertheless be employed for all classes of work within its capacity, where it is desired to produce two parallel surfaces quickly. A direct-connected motor-drive is employed for this machine, as were it belt-



A Double-Spindle Direct-Connected Motor-Driven Grinding Machine Equipped with Two Ring Wheels 21 In. in Diameter and Designed to Produce Two Parallel Surfaces Simultaneously

driven, a large and heavy countershaft would be required to mount a drum pulley long enough to accommodate the full sliding adjustment in the movable head of the machine. It is emphasized that with the direct-connected type of drive this overhead work is, of course, entirely omitted.

The head at the left of the machine is stationary, but the other one can be moved along the bed by a rack and pinion and clamped to grind any desired length within the capacity of the machine, which has a maximum opening of 11 in. between the wheels. The ring wheels are held in pressed steel chucks having an arrangement whereby the ring wheels may be adjusted to compensate for wear by moving them out of the chucks. This design, it is emphasized, is such that the adjustment can be made without removing the chuck from the spindle of the machine. The spindles, which are 3 in. in diameter at the inner bearings and 2½ in. at the outer ones, are geared together by a connecting rod at the back of the machine, so that their movement toward and away from the work is simultaneous and uniform. It is possible to throw this spindle out of gear and lock it, and move the opposite wheel to the work by a hand or foot lever. To bring the wheels in contact with the work, each spindle has a longitudinal feed of 1 in., which is actuated by a hand or foot lever through a rack and pinion on each outer bearing bushing. The end thrust of the spindles is taken on hardened and ground tool steel thrust collars, and the end play is controlled on the outer bearing bushing by an adjustable keyed collar held in place by a lock nut at the end of the spindle. Both bearing bushings slide with the spindle and completely incase it, an arrangement which it is emphasized reinforces the spindle when under load and protects it from emery dust. The geared hand lever feed on the sliding spindle gives the operator a leverage of 36 to 1, the lever being clamped on the pinion stud in a convenient position for use.

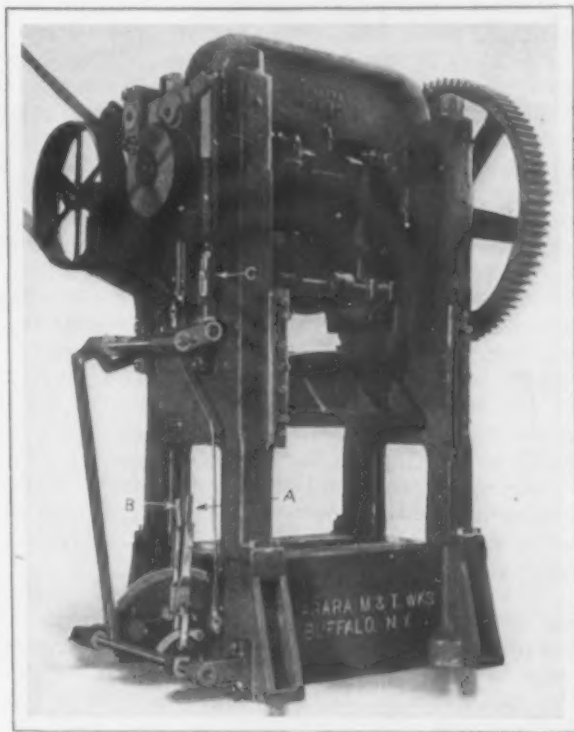
The motors are bolted on stud plates, which are mounted on ways planed on the main bed casting, and are clamped in position like the head and tailstocks of a lathe. The motor rotors are mounted directly on the spindles, which are of hard, crucible machinery steel and run in inserted bearing bushings, special end castings being provided on the motors to receive these bushings. The driving motors are fully inclosed and are rated at 10 hp. when running at 900 r.p.m. on 60-cycle alternating-current circuits. They are controlled by starting compensators with low-voltage and overload releases mounted on the back of the machine.

The machine is equipped with an automatically telescoping dust hood, which is hinged at the back to give free access for changing wheels. An airtight connection for exhausting the grindings is provided at the back of the machine. The floor space required by the machine is 28 x 72 in. and the center of the spindle is 38 in. above the floor. The shipping weight of the machine is 6000 lb. A set of nine work rests, ranging in width from 7/16 to 5/16 in., is regularly furnished with the machine. These rests have vertical adjustment and are supported from a slotted pad on the front of the bed casting.

The Pawling & Harnischfeger Company, Milwaukee, Wis., has been awarded a contract for installing a 90-ton crane in the plant of the Northwestern Iron Company, Mayville, Wis. It is of the high speed type, handling a 60-ton pig ladle, and will be used for retrieving pig iron from the cooling tanks. It will be equipped with a Cutler-Hammer lifting magnet.

Large Press with Safety Clutch Control

The Niagara Machine & Tool Works, 639 Northland avenue, Buffalo, N. Y., has recently designed a large double crank press with a novel device to control the action of the clutch and the motion of the slide. It is pointed out that this device permits the stopping and starting of the friction clutch at any time during the downward motion of the slide, and it will also stop the crosshead automatically at the highest point of its stroke. In addition,



Large Double Crank Press Equipped with a Special Type of Safety Control for the Clutch

tion, the press has all the conveniences for adjusting, etc., as the other large machines of the same type made by this company.

The clutch is non-repeating and the controlling hand lever returns automatically to the starting point, being locked in position after the slide reaches the highest point. It is pointed out that this is one advantage over the treadle actuated clutches of this type which are employed for the purpose, as they cause the crankshaft to make a complete revolution. To start the clutch, the operator takes hold of the lever A and at the same time disengages the locking lever B. The latter lever controls the action of a plunger engaging the connecting rod C, and if this lever is disengaged, the connecting rod is also released and the clutch lever A is perfectly free to be moved forward to the outer end of the segment to engage the clutch. A cam fastened to the outer end of the crankshaft controls the return motion of the clutch lever.

The driving mechanism is arranged overhead, thus making the machine accessible from all sides. This improved arrangement of clutch control can be applied by the builder to any of the other sizes and types of presses which are equipped with friction clutches.

The National Stoker Company, Covington, Va., announces that it has acquired all the patent rights of Paul L. Crowe for the Crowe mechanical chain grate stokers, and is prepared to fill orders for stokers and parts at short notice. Mr. Crowe is no longer connected with the company in any way except as a stockholder.

Modern American Blast Furnace Practice*

Problems Connected with the Smelting of Fine Ores—Possibility of Obtaining Better Economy in the Use of Raw Materials

HERMANN A. BRASSET†

The trend of development in the manufacture of pig iron is much the same the world over. With more and more difficult raw materials, progress is not so much in the direction of new records of production and fuel consumption, as in the ability to maintain the best results of the past in the face of greater handicaps. Since this paper cannot cover all conditions of raw materials and every kind of practice, I will confine myself largely to the foremost problems which the present generation of blast furnace men has been called upon to meet—the smelting of fine ores.

Modern blast furnace art is as much the result of practical experience and common sense as it is of science; however, the underlying principles of the process must be understood in order to appreciate its possibilities, as well as its limitations. I will, therefore, give a brief outline of the theory of the blast furnace process, and then discuss the possibilities and means of obtaining better economy, dealing first with the raw materials, next with the construction, and finally, with the operation of the furnace.

The blast furnace process for the production of pig iron is an invention of the Middle Ages. It was practiced in Germany in a primitive manner as early as the beginning of the thirteenth century. The first American blast furnace was built in 1644 on the shores of Massachusetts Bay. A tremendous development has taken place in the practical application since the early days, but the process, in principle, has remained the same. The reason for its survival to the present day lies in its economy. It always has been, and is to-day, the most efficient of all metallurgical processes.

SUCCESSFUL PRACTICE

The success of a blast furnace operation is measured by three results—quality of product, rate of output, and economy of operation. The first step towards their attainment is the realization that they can be accomplished by identically the same practice, the keynote of which is uniformity and heat concentration. If a blast furnace man strives for a uniform operation, giving the highest production combined with the lowest fuel consumption, he will also obtain the best grade of iron. The incessant struggle for uniformity should embrace not only the raw materials, but their distribution and descent in the furnace, brought about by proper plant design and furnace lines, as well as by intelligent operation. Such efforts will result in maintaining the largest possible proportion of "indirect" reduction, which allows the maximum amount of the carbon charge to be burnt at the tuyeres, and gives the highest hearth temperature, which means the best grade of iron. The escaping top gases will then have the lowest temperature and the highest ratio of CO_2 to CO , and will approach the ultimate economical limit, which is reached when the CO_2 : CO ratio becomes so low—i.e., the gases so lean—that they have lost their reducing power;

or when the top temperature has been decreased to a point where the ores are not properly preheated for the reduction and melting process. This limit is determined by the reducibility of the ores. How closely it can be approached in practice on various grades of iron depends on furnace construction, mode of operation, and their proper adaptation to raw materials.

RAW MATERIALS—ORE

In most countries the manufacture of iron starts with the best ores, rich in iron, and of a favorable physical structure. To-day ores are economically smelted which were formerly discarded. In fact, thanks to improved furnace construction, a general change in opinion as to the most desirable materials is taking place; and while formerly coarseness was considered an indispensable quality, we now object to large lumps and prefer granular ores, as they allow the closest contact between their metallic contents and the furnace gases, and therefore can be reduced with a minimum expenditure of fuel.

Conditions are sometimes aggravated by the dissociation of CO , induced by the presence of finely divided oxides of iron in the upper part of the furnace. The result of this reaction is a deposit of fine carbon upon the ore charges, causing them to swell and increasing the tendency of the furnace to hang. Too much importance, though, has been given to this phenomenon, especially in foreign literature. We have sufficient proof that it does not take place, to any marked extent, in a normally driving furnace.

Fine ores can be worked to the best advantage when they are delivered to the furnace in a state of physical and chemical uniformity. The United States Steel Corporation has made wonderful strides in this respect by developing a system of mining, sampling, grading and mixing of its ores, which has resulted in a remarkable uniformity of the various shipping grades. This is the more admirable considering the great variation of the physical and chemical character of the ores contained in the same mine.

As an example of the fineness of burdens carried at the present day, the following is a table giving the results of sieve tests on all the ores shipped to the South Works of the Illinois Steel Company during the season of 1913:

Ores	PER CENT. ON SCREEN								Through No. 100
	Per Cent.	No. 2	No. 8	No. 20	No. 40	No. 60	No. 80	No. 100	
Mesaba.....	83.3	25.40	26.86	12.54	10.86	6.92	2.76	3.34	11.33
Old Range....	16.7	30.16	30.76	15.01	8.14	4.16	2.06	2.74	7.01
Total.....	100.0	26.10	27.58	12.93	10.51	6.44	2.56	3.23	10.69

The suitability of any iron bearing material for blast furnace use depends on its physical form as well as on its degree of oxidation. Large lumps, even of easily reducible ores, are objectionable, because they reach the melting zone improperly preheated and reduced only on the surface.

*From a paper presented at the New York meeting of the American Iron and Steel Institute, May 22.

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With increasing fineness of the ores it appears more and more desirable to render the burden more open by preliminary treatment of the finest materials. Considerable is already being done in this regard by sintering and nodulizing the ores. Briquettes of flue dust and ore are made on a large scale in Europe by a number of well-known processes. In this country their introduction has been slow. The difficulty is to make them sufficiently strong, yet not too dense, and without introducing undesirable elements as binder.

Sintering, by the down-draft process, and nodulizing in a rotary kiln are practiced to excellent advantage on flue dust. A rotary kiln, treating about half of the flue dust produced, has been in operation at the South Works of the Illinois Steel Company for the past eight years. Its nodules of uniform size, rich in iron, and pre-reduced in the kiln without being melted, have proved beneficial to the furnaces even when running on the lowest coke consumption.

Ores high in alumina have previously been considered very undesirable. One of the most important of recent developments in American blast furnace practice is the commercial use of Cuban ores, very high in alumina.

A silica content affects the economy of the melting process at an increasing rate as soon as it exceeds the amount necessary to form the desired slag volume. The elimination of silicious gangue, clay, gravel or sand by washing is conducted on an extensive scale on the Mesaba range, the largest plant being operated by the United States Steel Corporation at Coleraine, with a daily capacity of from 30,000 to 35,000 tons of washed ore. By this operation ores with 45 per cent. iron content are enriched to 56 per cent. of iron, and at the same time a silica content of 30 per cent. is reduced to 10 per cent. and less.

As to titaniferous magnetites it is quite possible, and the latest results seem to indicate, that slags high in TiO_2 , if uniform, will offer no more serious obstacles than those high in alumina, not to mention the possible advantage of the titanium content in pig iron for foundry or other special grades.

BEE-HIVE AND BY-PRODUCT COKE

The consumption of coke, which is an artificial product, is subject to much greater variations, and depends to a far greater extent on human skill. To manufacture a coke of the most desirable quality and to develop the most suitable furnace lines, are to-day the two foremost tasks in striving for better furnace economy.

The coking process was at first conducted in bee-hive ovens. Its lack of economy and its limitations to certain grades of coal led to the development of the modern by-product oven, which affords the possibility of using a greater variety of coking coals; and owing to the recovery of the by-products and the higher yield, permits the assembly of coals at the ovens, there to be mixed in proper proportions for the purpose of manufacturing a uniform and suitable blast furnace coke. In the by-product oven a satisfactory coke can be made from coals which cannot be coked to any advantage in bee-hive ovens, and enormous coal fields have been made available for the manufacture of metallurgical coke, largely adding to the national wealth.

The by-product process is more flexible in the coking operation and is capable of improving the quality of the coke by variations of temperature and coking time to an extent unknown and impossible in bee-hive practice. By locating the by-

product ovens at the blast furnace and making them a part of the furnace or steel plant, the daily co-operation of manufacturer and consumer insures the best possible furnace results.

A hard metallic structure has always been considered the first requisite of a good furnace coke, indicating its ability to resist abrasion. The abrasive treatment to which the coke is subjected in the handling, and more so in the furnace where it is simultaneously attacked by the gases, is severe; and unless the coke is hard but not too brittle, and tough without being soft, it will go to pieces on its downward path in the furnace.

While fine, soft ores in the burden protect the coke against abrasion, the presence with such ores of coke breeze and dust is particularly detrimental by further increasing the density of the stock column and by accumulating on the walls, causing scaffolds to form. The heat value of coke dust to the furnace is practically nil, since that portion which is not blown over into the dust catcher is consumed in "direct" reduction with the ores and by the CO_2 in the gases, so that it has but little chance of ever reaching the tuyeres.

The effect of size on the vulnerability of the coke to dissolution by CO_2 is shown by the following laboratory tests, which were made at the South Works to determine the loss in weight of various kinds of coke on treatment with dry CO_2 at different temperatures:

Per Cent. Loss in Weight After Being Treated with CO_2 for Two Hours

Kind of coke	SAMPLES CRUSHED TO PASS THROUGH 1/4 IN. AND REMAINING ON 1/2 IN. MESH AT				SAMPLES CRUSHED TO PASS THROUGH 80-MESH AT			
	800° C.	900° C.	1000° C.	1100° C.	800° C.	900° C.	1000° C.	1100° C.
Connellsville.....	0.25	0.19	1.97	4.38	0.20	5.00	9.70	52.80
Klondike.....	0.45	0.84	2.90	6.50	0.50	4.55	16.27	46.33
By-Product:								
No. 1.....	0.50	1.34	4.92	10.26	0.80	5.45	15.75	40.98
No. 2.....	0.25	0.87	3.68	9.46	0.45	3.15	17.40	51.18
No. 3.....	0.40	0.70	3.00	10.10	0.50	4.20	13.00	64.60
No. 4.....	0.25	0.83	6.10	10.14	0.80	3.35	16.65	47.02

These results give an idea of the extent of the destruction of fine coke by CO_2 in the upper part of the furnace, and show the futility of charging breeze and dust into the stack with the expectation of obtaining heat value therefrom. The presence of large percentages of coke dust brings with it another disadvantage, in that it vitiates the composition of the flue dust and renders it more difficult to treat. Blast furnace coke should, therefore, be thoroughly screened at the ovens or in the furnace bins, preferably in both places, in order to obtain the cleanest possible fuel.

Careful screening is also beneficial in that it lowers the ash contents of the coke, and sometimes the sulphur, as illustrated by the following ash determinations of coke fires:

Screenings	By-product No. 1 ash	By-product No. 2 ash	By-product No. 3 ash
On 1/2-in. sieve.....	15.28	27.05	15.74
On No. 20 sieve.....	18.66	23.30	16.10
On No. 40 sieve.....	17.11	17.80	14.00
Through No. 40 sieve.....	17.28	19.71	15.00
Average of Coke.....	9.20	11.35	10.13

Until recent years the detrimental influence of high ash was not seriously felt in this country; therefore the washing of coals so common in Europe is still an exception here. But with leaner ores and increased cinder volume, the duty of fluxing an

excess of coke ash begins to seriously increase the cost of smelting. An excess of ash in the coke results in a three-fold loss, in the shape of wasted expenditure for transportation, additional flux, and the loss of efficiency through its taking up space and heat in the furnace which should have been applied to an equivalent amount of ore.

Even more objectionable than ash is sulphur, if it exceeds a certain limit, determined by the composition, temperature and volume of the slag. To eliminate sulphur as ordinarily present, it must be dissolved in the slag, which for a given composition and hearth temperature, has a fixed saturation point, and can take care of only a limited amount of this element. In Mesaba ore practice a sulphur content of over 1 per cent. in the coke is very objectionable, considering the prevailing cinder volumes and the inability to obtain uniform furnace operation on very basic slags.

The problem of reducing ash and sulphur in our coking coals by dry methods or by washing opens up a wide field for profitable labor. By-product coke should be properly quenched without any excess of water. Over-quenching spoils the surface, injures the structure and fractures the coke. When the coke is charged into the furnace by weight, a low moisture content is important also in confining the variations to a smaller range.

POROSITY AND COMBUSTIBILITY OF COKE

The physical standard by which blast furnace coke is generally measured, besides hardness and resistance to abrasion, is its porosity. It has been recognized that an open cell structure favors rapid combustion whereas a dense structure retards it. Since the speed of combustion primarily affects the furnace practice, it appears that the combustibility of cokes should be considered a foremost quality.

The importance of the combustibility of cokes was first brought to my attention in 1906, through the use of bee-hive Pocahontas coke on the large furnaces at the South Works of the Illinois Steel Company. In appearance and structure it differed from the Connellsville and Klondike grades, but the porosity tests scarcely revealed the great difference in the action of these cokes in the furnace. A furnace which on Connellsville or Klondike coke worked normally, would on Pocahontas drive at an excessive speed. The blast pressure would drop several pounds, and the hearth would become cold, necessitating a decrease of the tuyere area and wind volume, and a lightening of the burden.

The extreme softness of the coke evidently made it highly vulnerable to dissolution by CO_2 in the furnace stack. This and excessive abrasion reduced it to small size, favoring "direct" reduction, which accelerates the movement of the stock, and not sufficient coke reached the tuyeres to maintain the temperature of the hearth. On the small furnaces at the Union and Milwaukee Works this coke, for apparent reasons, gave better results.

At this time I made a series of combustion tests with these cokes, which showed vast differences in the time required for the complete combustion of a fixed amount of coke with natural draft under equal conditions. The time required for complete combustion of the bee-hive Pocahontas coke amounted to only 47.7 per cent. of the time required to burn the same weight of Connellsville or Klondike.

With these results at hand we experimented in the following years with different mixtures of these cokes, in order to arrive at the degree of combustibility which would produce the best results in conjunction with our ore mixtures and furnace lines. In this manner bee-hive Pocahontas coke

was successfully used in mixture with hard cokes. The best proportions proved to be two-thirds hard and one-third soft coke, as illustrated by the performance of No. 6 blast furnace at the South Works, which from January 3, 1909, to December 18, 1910, on this mixture, produced 307,517 tons of basic iron, on an average fuel consumption of 1969 lb. of coke per ton of iron.

The early coke produced in our by-product ovens, even from the same coals, burned too slowly and made our furnace operations exceedingly difficult by preventing rapid and continuous movement of the stock. Observing the action through the tuyere glasses would reveal each piece of such coke moving slowly and requiring considerable time before being entirely consumed, whereas cokes of proper combustibility should dance lively at the tuyeres and quickly disappear. With fast-burning coke, each molecule of oxygen in the air immediately finds its molecule of carbon in the tuyere zone, and the combustion takes place rapidly and with great intensity. By thus concentrating the combustion in a comparatively small area, the highest heat effect is obtained. With slow-burning coke, on the other hand, the molecules of oxygen are not all able to combine immediately with their molecules of carbon. The result is that the combustion is carried higher up in the furnace, the heat generated by combustion is spread over a larger area, and the top temperature increases. The coke pieces being consumed but slowly, no rapid shrinkage of the stock takes place, such as characterizes a fast driving furnace with a highly heated combustion zone. Consequently the blast pressure goes up, the furnace begins to hang, and good practice becomes impossible.

On small furnaces such slow burning coke interferes even more seriously with the practice than on large furnaces, because the wind volume and pressure cannot be sufficiently increased to accelerate the combustion. The extremely poor results with some by-product coke led to the breaking of the larger coke pieces, with the object of increasing the active surface of the coke charge and improving the combustion particularly for the use on smaller stacks. While better results were obtained in this manner, the proper remedy is the manufacture of a uniform coke with suitable combustibility.

The following laboratory tests illustrate that by-product coke can be made of as good combustibility as Connellsville bee-hive coke:

Kind of coke	COMPARATIVE LOSS OF VARIOUS COKES ON IGNITION IN A LIMITED CURRENT OF AIR							
	Loss in weight at							
	300° C.	400° C.	500° C.	600° C.	700° C.	800° C.	900° C.	1060° C.
By-Product:								
No. 1 (Gary).....	0.20	0.20	0.79	13.55	15.35	14.90	15.95	19.80
No. 2 (Special).....	0.64	0.59	6.23	14.50	15.75	15.72	16.80	22.48
No. 3 (Special).....	0.62	0.47	4.18	14.55	15.70	15.60	16.20	22.60
Kentucky Bee-hive.....	0.46	0.78	3.90	13.40	15.80	14.35	15.40	20.73
Connellsville Bee-hive.....	0.15	0.15	0.58	9.15	13.70	13.25	14.10	17.00

As a practical proof of what has been accomplished in perfecting the quality and uniformity of by-product coke, the results obtained on the blast furnaces at the South Works with coke from the Gary and Joliet ovens, are of interest. The coke is made with a coking time of from 16 to 18 hr., using 60 per cent. and over of low volatile Pocahontas coal in a mixture with various high volatile coals. The South Works furnaces, by their average coke consumption of 1944 lb. during the past 12

months, have established a yearly fuel record for any group of furnaces using a similar grade of ores. Monthly figures from May 1, 1913, to May 1, 1914, by stacks, as shown in Table 1.

Table 1.—Average Daily Production by Months and Coke Consumption, per Ton May, 1913, to April, 1914, Inclusive, Illinois Steel Company's South Works

Month	BESSEMER PIG IRON											
	No. 2 Furnace		No. 3 Furnace		No. 4 Furnace		"E" Furnace		No. 9 Furnace		Total Bessemer	
	Lb. Tons	Coke	Lb. Tons	Coke	Lb. Tons	Coke	Lb. Tons	Coke	Lb. Tons	Coke	Lb. Tons	Coke
1913												
May	543	1942	491	2179			565	1941	511	1963	528	2001
June	528	1974	411	2209	Blown out		570	1916	502	1958	503	2002
July	541	1912	408	2365	4-15-13		455	2087	468	1926	467	2057
August	515	1886	496	2006	Tonnage:		521	1912	469	1991	500	1947
September	508	1898	523	1890	723, 237		525	1691	516	1837	518	1828
October	496	1936	514	1964			514	1711	530	1849	514	1865
November	473	1946	528	1937	Blown in		467	1783	437	2144	477	1949
December			502	1932	2-15-14		536	1705	513	1798	515	1822
1914												
January	Blown out		474	1958			463†	1821			469	1903
February	11-23-13		479	2044	290	2464	489	1950	Blown out		445	2058
March			487	2061	518	1744	559	1815	12-18-13		521	1868
April			507	1991	543	1702	540	1845			528	1842
Average for 11 months.	517	1927	484	2023	485	1806	518	1851	492	1936	501	1927

TOTAL TONS MADE ON PRESENT LINING AT END OF PERIOD:
475,442 778,512 36,414 417,117 593,007

Month	BASIC PIG IRON											
	No. 5 Furnace		No. 6 Furnace		No. 7 Furnace		No. 8 Furnace		No. 10 Furnace		Total Basic	
	Lb. Tons	Coke	Lb. Tons	Coke	Lb. Tons	Coke	Lb. Tons	Coke	Lb. Tons	Coke	Lb. Tons	Coke
1913					(Basic)							
May	487	2159	422	1960	570	1828	467	2039	484	1926	486	1977
June	491	2195	413	1991	516	2077	439	2052	505	1893	473	2043
July	437	2177	396	2010	419	2103	586	1900	491	1923	450	2016
August	397	2351	433	1958	546	1987	482	1872	478	1962	477	1876
September			468	1873	530	1963	529	1792	500	1942	503	1893
October	Blown out		451	2007	531	1910	519	1840			500	1915
November	8-25-13		389	2016	572	1903	527	1894	Blown out		496	1929
December	Blown in		522	1654	582	1877	532	1886	10-1-13		551	1871
1914												
January	2-6-14				419‡	1986	536	1938			482	1958
February	402	2110	Blown out		529	2022	506	2029			484	2046
March	529	1882	12-4-13		532	2042	534	1888			532	1937
April	520	1910			567	1870	537	1904			542	1894
Average for 11 months.	476	2079	426	1960	526	1960	510	1915	492	1929	493	1961

TOTAL TONS MADE ON PRESENT LINING AT END OF PERIOD:
41,252 247,572 279,639 223,175 205,098

NOTE.—No. 1 Furnace on special grades.
† "E" Furnace banked, Dec. 24, 1913, to Jan. 10, 1914.
‡ No. 7 Furnace banked, Dec. 24, 1913, to Jan. 10, 1914.

LIMESTONE AND FINE ORES

As the economical smelting of the finer and leaner ores of modern times requires special care in the manufacture of coke in order to obtain the best furnace practice, so also should we carefully prepare the flux and adapt it to the fineness of the ores and their increasing silica content.

The ore charges themselves have become so dense that any further additions of fines with the limestone are detrimental, and these should be eliminated by screening. At the same time, big lumps of stone are also more objectionable than formerly, because with the fast driving of a modern furnace they have not time to become properly preheated and reduced before they reach the melting zone.

Formerly, when the silica in the ores was so low that the cinder volume without the addition of special silicious materials was below the practical limit, a limestone containing 5 per cent. or 6 per cent. of silica was not objectionable. To-day, however, the natural silica in the ores has generally increased the slag volume to a point where it exceeds that required for carrying off the sulphur and insuring regular furnace operation.

While a moderate magnesia content in the slag is not objectionable, the use of dolomite is injuri-

ous to good furnace practice with Lake ores, where the slags are fairly high in alumina and where a low zone of fusion must be maintained. To eliminate the sulphur it has been found necessary in our practice to run on a more basic slag when using dolomite, which makes uniform furnace operations more difficult and results in a higher fuel consumption. With slag very low (about 8 per cent.) or very high (about 30 per cent.) in alumina, the use of dolomite has been found beneficial, as also in the manufacture of spiegel and ferro-manganese.

AIR AND THE GAYLEY DRY BLAST

Of all the elements introduced into the blast furnace in a given unit of time, air is the largest both by volume and by weight. It is therefore not surprising that great efforts were made towards its improvement. The introduction of hot blast marks the greatest step ever taken in improving the economy of the blast furnace. By the use of hot blast, combustion is accelerated, intensified and confined to a smaller space, the melting zone is concentrated, and the hearth assumes a higher temperature. The grade of iron becoming richer, demands more burden of ore to the charge of coke. This decreases the amount of gas per ton of iron and in turn reduces the top temperature, again saving heat and making possible a more economical reduction. It also causes less carbon to be consumed by CO₂ in the upper part of the furnace, whereby more is made available for combustion at the tuyeres. These effects being cumulative, the application of hot blast resulted in a far greater fuel saving than was expected from the mere addition of the heat units contained in the blast; and hand in hand with it went a large increase in production.

Another more recent method of obtaining fuel economy is the Gayley dry blast. The effect of this is the same as that of an equivalent increase in blast temperature. In addition it gives to the furnace a uniform supply of oxygen by weight. To this uniformity is attributed the extraordinary saving, particularly in localities with moist and variable climates, which in some cases was found to be greater than that corresponding to an equivalent increase in blast temperature. Its applicability depends on local conditions, influencing the comparative cost of drying the air vs. raising its temperature and on the degree of existing furnace efficiency. At plants where a further increase of blast temperature is not profitable, because the limit of heat concentration is already reached, the dry blast will fail to be economical, except in the effect of its uniformity, which in natural air practice can only be approached by the most careful regulation of blast heats and of the weight of air blown.

This latest effort to improve the air by the enrichment with oxygen is being made in Europe, whether with profit or not remains to be seen. Since the ratio of CO₂ to CO cannot be increased above the point where the gas loses its reducing power, and this point remains the same whether or not it is diluted with nitrogen, and since this limit, as well as that of lowest top temperature, can be approached by the employment of less expensive means, it is at least doubtful if the oxygen method will ever come into general commercial use. The uniform heating of the furnace charges to the melting point requires time and a certain volume of gases, and these apparently cannot be decreased, even if it should be possible to shorten the reduction period by lowering the inert nitrogen content of the gas.

(To be continued.)

Death of James M. Swank

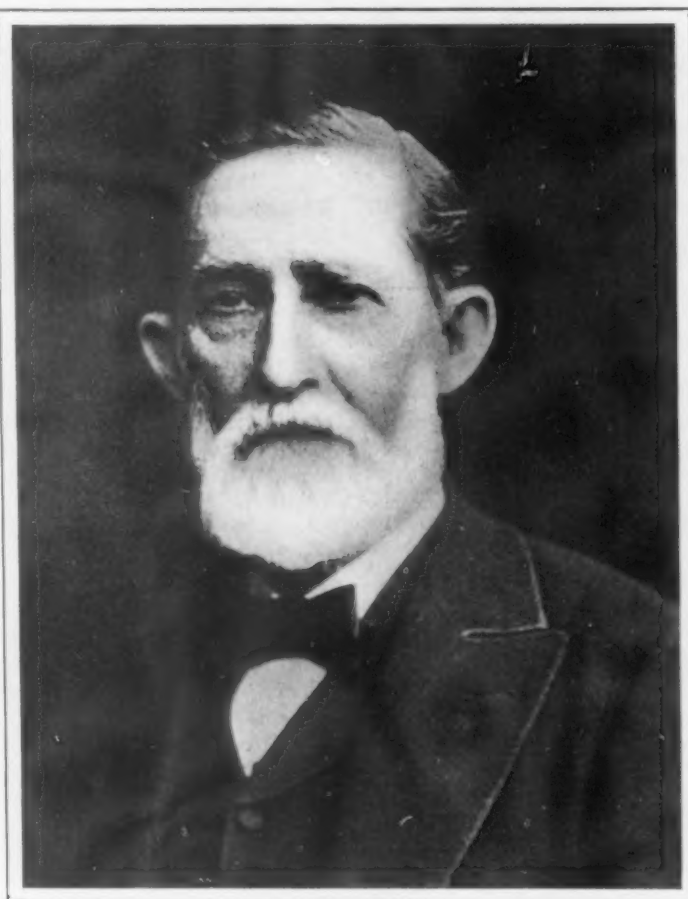
Completing a well-rounded career of far more than ordinary usefulness, his closing years ringing with plaudits of high appreciation of his life's work, James M. Swank died June 21 in Philadelphia. In his death the iron trade has lost a man whose name had become more widely known than that of any other man connected with the industry in the United States. For over 40 years he had been the statistician of the trade and in all that time had been actively identified with every movement designed to better the condition of the industry, especially in upholding and defending the protective policy as one of the means of more thoroughly developing the resources of the country. He continued in active work up to the end of 1912 when the infirmities of age admonished him that it was time to lay aside the strenuous duties attached to his official connection with the American Iron and Steel Association. He was then considerably over 80 years of age.

The writer enjoyed exceptional opportunities to observe the character of Mr. Swank, having known him quite intimately for several years prior to his acceptance of the position of secretary of the American Iron and Steel Association, while both were residents of Johnstown, Pa. Mr. Swank removed to Philadelphia and entered upon the duties of his new position January 1, 1873, and on April 1 of that year the writer was engaged by him as an assistant in the office. This connection continued, with a brief interval, until January, 1887. The relation-

ship thus established created a bond of friendship which has only been severed by death. The impression of Mr. Swank thus gained was that he was a man of unyielding purpose, uninfluenced by prejudice, of keen judgment and kindly disposition even toward those of opposite opinions. In the early days of his connection with the American Iron and Steel Association the contest between protectionists and free traders was bitter but in the various controversies in which he was engaged Mr. Swank never stooped to personalities, but was always fair and courteous to his opponents. His weapon was reason, and it was always based on either statistics or the lessons of experience and his arguments were on a high plane. For a long period his work in behalf of protection overshadowed his efforts in the

direction of gathering statistics of the trade, but from the very beginning of the discharge of his official duties he saw the necessity of establishing a statistical bureau whose work should be so thorough as to fear no challenge of inaccuracy. From year to year the statistical work of the association was broadened and in the course of time it became the distinguishing feature. In this field Mr. Swank attained a higher eminence than any other man at home or abroad. The statistical reports of the American Iron and Steel Association, under his management, became a treasure house of information sought by economists throughout the world and invariably accepted as authentic.

If his ability, pertinacity and sound judgment had been diverted into more material directions, Mr. Swank would probably have been numbered among the country's men of wealth. He had no disposition of this kind, however, but was content to work for a modest salary, carrying out what he considered to be his duty in advancing the interests of the whole people of this country. While he was immediately connected with the iron trade, and cared particularly for its welfare, he viewed the protective question with no narrow mind but desired to see its benefits extended to all industries needing such assistance for their proper promotion. In all the tariff campaigns in which he was an active participant he sympathized with the representatives of other industries and helped them when there was danger of their being singled out for attack. Few men have shown such self-abnegation and have displayed such



James M. Swank

singleness of purpose, fighting for a high ideal to the very end of life. He had more than his share of domestic bereavement, losing a son and a daughter, his only children, just as they were becoming adults. He leaves a widow.

Perhaps because of Mr. Swank's long training as an editor, he regarded the printed word as a more effective appeal than the spoken argument. He shrank from appearance in public assemblies and made no attempt to establish a reputation as a speaker. His correspondence was most voluminous. Up to his last illness he kept in epistolary communication with men of industrial and economical prominence in all parts of the country, never allowing a letter to remain unanswered even though to a less conscientious man it might have appeared to require

no further attention. His kindly disposition was such that he would go to extremes to serve a friend or even an acquaintance. The writer has often known him to put himself to much inconvenience for the purpose of performing a service of this kind. After a life of unfailing activity he leaves a most fragrant memory.

G. W. C.

Biographical Sketch

We take from an article printed in *The Iron Age* of January 2, 1913, the following biographical sketch, the publication of which was occasioned by his retirement:

James Moore Swank was born in Westmoreland County, Pa., July 12, 1832. His great-grandfather on his mother's side, John Moore, was a member of the Pennsylvania Constitutional Convention of 1776, was subsequently the first president-judge of Westmoreland County, and afterward was a member of the State Senate. When James was in his seventh year his father removed his family to Johnstown, Pa. He was clerking in his father's store, in his twentieth year, in 1852, when he was asked to take charge of the local Whig newspaper, which was without an editor, and thenceforth for many years he was its editor and publisher. This paper was for a time known as the *Cambria Tribune*, and afterward became the *Johnstown Tribune*, under which name it is still published. Parting with the *Tribune* in December, 1869, Mr. Swank passed the next three years in Washington, D. C., first as clerk of the Committee on Manufactures of the House of Representatives, and afterward as chief clerk of the Department of Agriculture. In December, 1872, he resigned the last named position to take charge of the work of the American Iron and Steel Association, which has always had its office in Philadelphia.

Mr. Swank was specially qualified for his duties in charge of the affairs of the American Iron and Steel Association. Being a journalist by profession, he thoroughly understood the work of preparing and printing the various publications of the association. Brought up in an iron town, he was familiar with manufacturing conditions and was an ingrained protectionist. In the early years of his connection with the association the tariff question was ever prominent, and he was steadily called upon to prepare arguments in favor of the protective policy and to furnish statistical and other information to protectionist members of Congress. He was untiringly in correspondence with men of prominence in all parts of the country fortifying the work of protection in localities where it was weak and encouraging the efforts of those who were writing arguments in its favor. In every national campaign he distributed great quantities of protectionist literature.

In addition to the work performed, as indicated above, Mr. Swank found time for more general literary achievements. In 1878 he published in book form an "Introduction to a History of Iron Making and Coal Mining in Pennsylvania," in which he presented many facts regarding the pioneers in the manufacture of iron and steel in this country, putting these facts in connected and permanent form. In 1891 he brought out his most ambitious work entitled "Iron in All Ages." Numerous other works have been issued by him dealing with literary matters or with personal reminiscences.

No man has written more lovingly of his native State and its people than has Mr. Swank. Throughout his life he has seized every chance to extol the greatness of Pennsylvania and the achievements of its citizens. His love for the home folks manifested itself again and again. One of his most interesting works is the volume entitled "Cambria County Pioneers," in which he gives biographies of men who were prominent in the founding of Johnstown and in developing the resources of the region which is now chiefly known through the location there of the great establishment of the Cambria Steel Company.

Comments on Mr. Swank's life and services

have been received from a number of men of prominence in the iron trade, who have taken this occasion to give expression to their estimate of his services and their sorrow for his death. They are presented below.

E. H. Gary, Chairman United States Steel Corporation

I cannot, without devoting more time than I have at my command in the short time you give me, adequately express my opinion of the work of Mr. Swank. He has received and is entitled to credit for most efficient and influential work in relation to the iron and steel industry in this country. He has shown a high order of intelligence in the discussion of commercial, economic and political questions that have necessarily come within the scope of his duties as general manager of the American Iron and Steel Association. Both the lawmakers and the manufacturers are greatly indebted to him for the illuminating character of his publications and letters.

Willis L. King, Vice-President Jones & Laughlin Steel Company

I regret to learn of the death of Mr. Swank. He has passed away full of years and honor. He leaves with those who knew him longest and best a memory of upright manhood and devotion to principle. He had an abiding faith in the protective tariff as necessary for the growth and prosperity of the country, and his writings on this subject are such models of fairness and expert knowledge that future generations will add to his greatness and appreciate perhaps more fully than we what manner of man he was. A kindly gentleman, modest and firm for the right, indifferent to personal preferment and wealth he has endeared himself to all who ever knew him.

A. F. Huston, President Lukens Iron and Steel Company

I am pleased to express my appreciation of the late James M. Swank, who for long years was general manager of the American Iron and Steel Association. So far as I know, no one ever undertook to question the accuracy of the statistics he compiled. He worked long and faithfully at this and was of inestimable value not only to the iron and steel trades of this and other countries but to the business public at large. He was painstaking and thorough and had a genial personality that attracted him to all. I do not know how long he served the association, but I have been in the iron and steel business for about 42 years, and as far back as I can remember he has been active in keeping the statistics. One of the old time reliable business men has been taken from us and we mourn his loss.

James Lord, President American Iron & Steel Mfg. Company

In the death of Mr. Swank the iron and steel industry has lost a prominent and unique champion. His pleasing personality made his office a Mecca for manufacturers, especially during the period of fierce competition. His statistics were regarded as official and final, and his pen was always active in the interest of his chosen theme. He was the Nestor of the trade—a link connecting the past and the present. He carries to the grave the loving respect of all his associates in the great industry.

William L. Brown, President Federal Furnace Company

The iron men of our entire country will deeply regret the death of Mr. Swank. His work was the foundation of statistical information. In it he was a genius. His personality, tact and encouragement were of the highest order and the benefits he gave to the older generation will be of incalculable benefit to generations to come.

ROCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

W. S. Pilling, of Pilling & Crane

James M. Swank has been a familiar figure in the iron trade for upward of 40 years. He was always a staunch protectionist but not unreasonably so. His chief value to the industry has been his patient and tireless compilation of statistics. For many years the association which he represented stood alone in the United States in the gathering and tabulation of statistics and in the publication of a Directory, practically accurate in its descriptions of iron and steel works. He was himself always in the background, never seeking but, in fact, shunning all public recognition. In my opinion, his actions were based more upon his desire to be of service to the trade than for the benefits which he personally derived. He has been a unique character in the industry.

William G. Gray, Statistician American Iron & Steel Institute

[Mr. Gray was from 1889 to 1913 assistant to Mr. Swank in the office of the American Iron and Steel Association.]

Mr. Swank devoted one-half of his life to the up-building of the iron trade of the United States. He perfected and brought up to a high standard the work of collecting full and complete statistics of this important industry in this country. The Annual Statistical Reports, of which 40 had been issued down to the time he retired as vice-president and general manager of the American Iron and Steel Association, are models of statistical accuracy and thoroughness. He originated the Directory to the Iron and Steel Works of the United States, and personally supervised the compilation and publication of 17 editions of this book, together with five Supplements. He was a firm and courageous advocate of the policy of protection to home industry, and had often said that "he had never lost a tariff fight." In "Iron in All Ages" he has left a monument that places him high in our list of accurate historical writers.

TARIFF MAY BE REVISED

Revenues Are Insufficient, the Income Tax Falling Far Short

WASHINGTON, D. C., June 24, 1914.—That a revision of the tariff and possibly of the income tax law within the next 18 months will be required to provide revenue for meeting the expenses of the Government is the conviction which appears to be crystallizing in the minds of the majority leaders of both houses and of the Treasury experts who have recently gone over the revenue question in exhaustive detail at the direction of Secretary McAdoo. Treasury officials no longer make any pretense of concealing the failure of the income tax law, but they are still defending the Underwood tariff act as a revenue producer, and in statements recently given to the daily press Secretary McAdoo has referred with considerable complacency to the fact that while the income tax law has fallen nearly 50 per cent. short of the anticipated collections, the customs revenues have exceeded the estimates to such an extent as to completely close the gap.

The prediction of Secretary McAdoo that the income tax receipts will be increased when some returns now under suspicion have been investigated is not likely to be verified. Indeed, it is an open secret in the Internal Revenue Bureau that thousands of returns show excessive payments of tax, made as the result of doubt as to the exact meaning of the law and for the purpose of being well on the safe side. It is probable that in a few isolated cases underpayments will be discovered, but both the Secretary of the Treasury and the Commissioner of Internal Revenue have been on record for months as pledging the department to use no drastic measures in view of the difficulty which the officials themselves have encountered in construing the law.

BUSINESS DEPRESSION CUT DOWN INCOMES

The naked truth about the collections under the income tax law for the current fiscal year is that the experts who compiled the estimates of its producing power for the Committee on Ways and Means blundered fatally in calculating the exemptions in individual incomes derivable from stocks in corporations which pay the corporation income tax of 1 per cent. levied by the Payne-Aldrich act. All such individual incomes are exempt unless they exceed \$20,000 per annum, but where this amount is exceeded a graduated surtax applies. The experts were misled as to the large number of incomes in excess of \$20,000 to which the surtax would apply and the Treasury officials are now convinced that while the number of taxable incomes was not greatly overestimated there was a disastrous miscalculation as to the number of incomes liable to the surtax. In addition to these miscalculations, another important factor is to be reckoned with during the current fiscal year, namely, the enormous decline in corporate net earnings and dividend disbursements and consequently in individual incomes as the result of the business depression that has prevailed to a greater or less extent in all parts of the country since the beginning of the current fiscal year. This shrinkage has caused a falling off both in the corporation tax and in the surtax collected on individual incomes. Figures recently compiled show, for example, that the dividends of nine railroad systems which two years ago aggregated nearly \$35,000,000 will not exceed \$10,000,000 for the current year. Summarizing the situation, it would appear that the chief reason for the failure of the income tax law to produce an amount equal to the estimates is that incomes have declined throughout the country and the Commissioner of Internal Revenue cannot tax what does not exist.

If the Treasury is able to avoid a deficit for the fiscal year ending June 30, it will be solely due to the fact that the Underwood tariff act is not yet in full force; in other words, that the graduated reduction in the sugar schedule has not yet become wholly effective. During eight months of the current fiscal year sugar yielded approximately \$40,000,000 in customs revenue. On March 1, 1914, the rate was reduced, and on May 1, 1916, sugar will go on the free list. Even should the Treasury Department reimburse itself by the sale of bonds for all Panama Canal expenditures during the current fiscal year the annual statement cannot possibly show a surplus in excess of the amount received from customs collections on sugar, which next year will hardly exceed one-fourth the amount received this year and which in two years will vanish altogether.

A BOND ISSUE NOT POPULAR

A bond issue as the alternative of a comprehensive revision of the tariff and income tax laws has been considered by the Congressional leaders, but is not approved. At best it would be a temporary makeshift, for obviously Congress cannot permit the Treasury Department to supplement constantly recurring annual deficits by the sale of bonds. The restoration of a part of the sugar duty has been suggested and is strongly favored by certain Southern Democrats, but the majority leaders are so committed to free sugar that it is difficult to see how any increase could be made in this schedule without stultifying the authors of the Underwood act.

What the outcome will be, beyond the obvious fact that something must be done in the near future, unless a tidal wave of prosperity should overtake the country, no one here ventures to predict, but it goes without saying that the situation is causing the responsible party leaders great uneasiness, which has been augmented by developments in the Mexican situation, indicating that the United States must continue for an indefinite length of time an extraordinary outlay on this account.

W. L. C.

The additions to the plant of the Cleveland Metal Products Company, Cleveland, Ohio, will include a rolling mill, 81 x 191 ft.; casting building, 57 x 81 ft., and a manufacturing plant, 73 x 266 ft. The buildings will be of steel and brick construction.

Opinions on Business via Washington

National Supply and Machinery Dealers Favor Convention in the North Next Year—C. H. Jenkins
New President of the Manufacturers' Association

The American Supply and Machinery Manufacturers' Association, which held the first session of its convention at White Sulphur Springs, W. Va., June 15, jointly with the National Supply and Machinery Dealers' Association, condensed its programme for Tuesday and Wednesday mornings into one long session on Tuesday, at which officers were elected and adjournment taken. The proceedings of the first day of both associations were given in *The Iron Age* last week. The new officers of the American Supply and Machinery Manufacturers' Association are as follows: President, C. H. Jenkins, Moran Flexible Steam Joint Company, Louisville, Ky.; first vice-president, Farnham Yardley, Jenkins Bros., New York, N. Y.; second vice-president, J. K. Broderick, Broderick & Bascom Rope Company, St. Louis, Mo.; third vice-president, Joseph M. Hottel, Delta File Works, Philadelphia, Pa.

Executive Committee: J. W. Wall (chairman), Gardner Governor Company, Quincy, Ill.; Lewis B. Curtis, The Curtis & Curtis Company, Bridgeport, Conn.; Chas. J. Graham, Graham Nut Company, Pittsburgh, Pa.; Edwin A. Ludden, Detroit Oak Belting Company, Detroit, Mich.; Chas. W. Seiberling, Goodyear Tire & Rubber Company, Akron, O.

The slate was made up by a nominating committee composed of Melville W. Mix, Dodge Mfg. Company, Mishawaka, Ind.; John Trix, American Injector Company, Detroit, Mich.; S. P. Browning, Ohio Valley Pulley Works, Maysville, Ky.; Willard Parker, Pennsylvania Shafting Company, Spring City, Pa.; N. A. Gladding, E. C. Atkins & Co., Indianapolis, Ind.; I. R. Bailey, Goodyear Tire & Rubber Company, Akron, Ohio; H. A. Wagner, American Iron & Steel Mfg. Company, Lebanon, Pa.; J. W. Wall, Gardner Governor Company, Quincy, Ill.; W. C. Henning, A. Leschen & Sons Rope Company, St. Louis, Mo.

DESIRE FOR A TRIPLE CONVENTION

At the opening of the meeting D. K. Swartwout, Ohio Blower Company, Cleveland, Ohio, the retiring president, surrendered his chair to Vice-President C. H. Jenkins, while he made an address reviewing the year and voicing appreciation for the co-operation he had received from the members and from Secretary-Treasurer F. D. Mitchell. He said the net gain had been 14 members in the year. He hoped that in the coming year there would be a resumption of the triple convention, embracing the manufacturers and dealers of the North and South.

Mr. Mitchell, in his report, also spoke of the desirability of a convention which would include the Southern Supply and Machinery Dealers' Association, as heretofore, at some point accessible to all. Other reports were submitted by Joseph M. Hottel, chairman of the executive committee, and Frederick H. Payne, Greenfield Tap and Die Corporation, Greenfield, Mass., chairman of the membership committee.

The following committee on resolutions was announced by Mr. Swartwout: Edward C. Hinman, American Steam Pump Company, Battle Creek, Mich.; Charles B. Raymond, B. F. Goodrich Company, Akron, Ohio; S. D. Latty, Kirk-Latty Mfg. Company, Cleveland, Ohio; A. H. Dillon, Youngstown Sheet & Tube Company, Youngstown, Ohio:

W. H. Glatt, New York Leather Belting Company, New York, N. Y.

The meeting approved the appointment of a time and place committee to co-operate with the two associations in the matter of a joint convention next year, and President Swartwout named Willard Parker, chairman, and Frederick H. Payne and Secretary Mitchell to constitute the committee.

A WORD ON THE UPPERMOST TOPIC

Willard Parker, of the Committee on Speakers, preliminary to introducing A. H. Baldwin, Chief of the Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, who had arrived too late to speak the preceding day, said in part:

Business is not as good as it ought to be. Speaking from personal experience, I imagine I voice the opinions of the majority of the members of this association when I say that the number of orders we are all receiving is fully equal to our average, and in many cases exceeding, but that the average size of these orders is smaller than usual. What is the cause of this? It simply means that everybody is buying for his immediate wants, rather than stocking for the future.

It is interesting to refer to statistics and find out just how bad business really is. The order book of the United States Steel Corporation and its current price on steel bars form a very accurate barometer of general business conditions.

On May 31, 1914, the United States Steel Corporation reported the tonnage on order books to be 3,998,160 tons.

On December 31, 1910, the tonnage reported was 2,674,858 tons. In other words, the tonnage on the order books of the Steel Corporation today is just 50 per cent. greater than it was December 31, 1910. This is one tube of my commercial barometer.

The other one is the price of steel bars. In 1910 and 1911 steel bars were sold at \$1 and \$1.02½ and a maximum of \$1.05 per 100 lb. f.o.b. Pittsburgh. Today the ruling price f.o.b. Pittsburgh, is \$1.15, showing that the extremely low and ruinous level reached by the steel trade in 1910 and 1911 has not yet been touched by \$2 to \$3 per ton. This is the other tube of my barometer.

PRESIDENT WILSON EXPRESSES CONFIDENCE

The present national administration is thoroughly in harmony and in sympathy with all righteous endeavors on the part of the commercial interests of this country. At the request of our executive committee I had the honor of visiting the White House and requesting an expression from the administration in regard to its position. It is with great pleasure that I read the following letter received from the President of the United States:

My dear Sir:

I earnestly hope the convention of the Supply and Machinery Manufacturers may be successful, and that its deliberations will result in an increase of prosperity to the manufacturers who are connected therewith, and through them to the workmen who are employed by them.

It is my deep desire that the door of opportunity shall be open wide both at home and abroad for the advance of American industry in every form of honorable and legitimate endeavor. I rest in confidence upon the proven ability of American men of affairs to lead our industries to further victories when their minds and hands shall have been fully set free and the course lies clear before them.

Sincerely yours,

WOODROW WILSON.

MR. WILLARD PARKER, vice-president,
Pennsylvania Shafting Company,
Spring City, Pa.

Mr. Baldwin came prepared to speak of the constructive work being performed by his department, but found that he was expected to explain what the Washington administration promises to business. He said he was unauthorized to say a word for the President or the head of his department, that he carried no message from the administration and in expressing his personal views he must weigh every sentence. He referred to President Wilson's recent assertion that the condition of business was largely psychological and said that no man less courageous than Mr. Wilson would have made the statement. Mr. Baldwin said he had found the President to be right. While agreeing that business is quiet, he said there is every reason to be optimistic for low ebb had been reached and an early recovery is certain, though it might come slowly. His duties bring him in touch with commercial organizations all over the country, and he could not believe from his observations that business would be long depressed.

CERTAINTY NEEDED AS TO LEGISLATION

Alluding briefly to the tariff, he said the administration had come into power with action on the tariff as part of its mission, and it is generally understood that no change in duties can be made without affecting adversely some lines of business. As for the revision of the currency law, Mr. Baldwin said this nation had blundered along to success under an unsatisfactory system. He was certain that when the political turmoil is over and the business public knows what is what in legislation, the business of the country will go forward in increasing volume. The work of the Department of Commerce Mr. Baldwin declared to be almost entirely constructive, and he felt that practically every active business association was working along similar lines. A few years ago the department knew very little of the field it serves, but that has been changed, largely through the co-operation of trade and commercial organizations.

FOURTEEN TRADE REPRESENTATIVES ABROAD

Since sales promotion is the object of the American Association, Mr. Baldwin explained the operation of the consular trade reports for which, he said, no American had reason to blush. The present temper of that service is entirely serious and earnest, and it has resulted in business amounting to millions of dollars. Incidentally Mr. Baldwin defended Government employees against the charge of being clock-watchers and said the general average of efficiency is as high as in most business enterprises. He said that 20,000 copies of the Daily Consular and Trade Reports had proved inadequate, but that on July 1 they were to be placed on sale at \$2.50 a year, which would cover the cost of paper and printing. The item of expense having been approved, this country will soon have 14 representatives in foreign cities who will give their sole time to studying foreign trade opportunities for American business men. The speaker believed these agents will prove a powerful weapon in the export trade.

Mr. Baldwin said that Government work was done under many restrictions—those imposed by law, others financial and some political. Full advantage has not been taken of the opportunities presented by his department and he urged business men to become more familiar with it. He cited a case where a firm had paid \$50 for information which a two-cent stamp would have obtained from his bureau.

In view of present trade conditions, a resolution

was passed urging business men to take greater interest in legislation, both state and national, with a view of obtaining such laws as are for the general good. Officers were then elected and President Jenkins, after a few words of thanks, asked for the co-operation of the members in the endeavor to bring about a triple convention next year, after which adjournment was taken.

C. S. Farquhar Re-Elected President

At its session Tuesday morning the National Supply and Machinery Dealers' Association worked so expeditiously that it was able to finish the business scheduled for that day and Wednesday. At the close of the session, Charles S. Farquhar, Chandler & Farquhar Company, Boston, was re-elected for the ensuing year. O. P. Meckel, Baird Machine Company, Pittsburgh, was elected first vice-president in place of Henry Prentiss, Prentiss Tool & Supply Company, New York, who wished to retire from office. The first vice-president has charge of the machine tool interests of the organization. George Vonnegut, Vonnegut Hardware Company, Indianapolis, Ind., was made second vice-president, succeeding the late J. O. Harron, of San Francisco. Secretary-Treasurer Thomas A. Fernley and Advisory Secretary-Treasurer T. James Fernley were continued in office. The advisory board, consisting of past presidents, remains unchanged as follows: Edgar E. Strong, Strong, Carlisle & Hammond Company, Cleveland, Ohio; George Puchta, Queen City Supply Company, Cincinnati, Ohio; W. M. Pattison, W. M. Pattison Supply Company, Cleveland, and W. L. Rodgers, Pittsburgh Gauge & Supply Company, Pittsburgh, Pa. In place of M. B. Barkley, Cameron & Barkley Company, Charleston, S. C., and George Vonnegut, the following were elected to the executive committee: Herbert W. Strong, Strong, Carlisle & Hammond Company, Cleveland, and W. J. Radcliffe, E. A. Kinsey Company, Cincinnati, the re-elected members being W. T. Todd, Somers, Fitler & Todd Company, Pittsburgh, and W. A. Ridings, Syracuse Supply Company, Syracuse, N. Y.

The report of Secretary-Treasurer Thomas A. Fernley showed that a substantial amount had been added to the reserve fund. The record of the finances was favorably reported on by the Auditing Committee, E. B. Hunn, C. S. Mersick & Co., New Haven, Conn., and George Vonnegut. Mr. Fernley was instructed to acknowledge with thanks an invitation for the association to hold its next convention at the Panama-Pacific International Exposition. The convention, however, on motion of George Puchta, Queen City Supply Company, Cincinnati, expressed its preference for Cleveland, Pittsburgh or Philadelphia as the next meeting place, and the secretary was directed to ascertain by mail the wishes of the entire membership. In discussing the next convention it was emphasized that the entertainment features should be so arranged as not to interfere with the business sessions and hope was expressed for a joint triple meeting.

Following a discussion of the practice of giving a 2 per cent. discount for cash in 10 days it was recommended that members give favorable consideration to the use of the word "premium" to impress on the buyers that they were getting a premium and not a discount on the merchandise.

IMPROVEMENT IN COST KEEPING

In the discussion of the tendency of the times in association work and of methods that would give the greatest service to members, it was pointed out

that an organization of middlemen could take no part in the classification of a trade and that resale prices must be tabooed. It was recommended that the association follow the lines of cost educational work and Secretary Fernley was instructed to collect, tabulate and furnish to the members information regarding methods of keeping records of the cost of goods and stock on hand. A system of keeping stock records was described and favorably commented on. It provides for the placing on each bin wherein fittings, etc., are kept, of a card on which is written the maximum and minimum amount of stock the bin should contain. Should the amount fall below the minimum the stock-keeper at once puts in a requisition for a new supply and also places a red card on the bin. The red card remains in place as a constant warning until the bin is replenished.

STANDARDIZATION OF JOBBERS' CATALOGUES

A paper on the standardization of supply jobbers' catalogues was read by C. F. Beezly, Jr., manager trade catalogue department, R. R. Donnelley Sons Company, Chicago. In part he said:

I suggest these three points as of practical value to jobbers who have catalogues to issue:

First, that the standardization of mill supply jobbers' catalogues is not an isolated subject, but rather the expression in one industry of a widespread economic movement.

Second, that the question is not, properly speaking, whether or not mill supply catalogues shall be standardized. It is rather a question as to how far they can be standardized to the greatest advantage.

Third, assuming the most efficient degree of standardization, what are the advantages that such standardization means to you as jobbers?

It is impossible to go over the general subject of standardization in a comprehensive manner in a few minutes, but it is sufficient to note that from the time Sir Joseph Whitworth brought about the standardization of the design of screws in England, seventy-five years ago, up to a few days ago, when the manufacturers of enamel sanitary were formed a national association to bring about, among other things, a standardization of sizes, there has been an increasing realization of the enormous economic loss in money, time and material that is consequent upon the employment in any industry of all manner of irregular shapes and sizes and styles and methods to accomplish the same purpose. The adoption of standards has meant such great gain that it is difficult now to select any well-established industry in which standardization is not already playing an important part.

When things become standardized we very soon wonder how they could ever have been otherwise. It is hard, for instance, to realize that it is not very long ago when there were no standard shapes of structural steel and iron and when the different manufacturers of railroad rails employed different designs in rolling them. It is interesting to note that in spite of the obvious advantages of standardization there has scarcely, if ever, been a step taken towards standardization in any industry where there has not been a decided opposition because this manufacturer or that manufacturer wanted to keep his goods entirely different from all others; he wanted to preserve his complete individuality.

The standardization of mill supply catalogues is in keeping with the standardization that is being effected in other lines of jobbers' catalogues. It is an expression of the same movement which, within the last three months has made the catalogues of practically every jobber in the room obsolete on a most important line through the standardization of standard and extra heavy flanged fittings.

After explaining, step by step, the economies to be effected by the correct degree of standardization, Mr. Beezly pointed out that the use of catalogue

pages standard in size, type, make-up, illustrations, and to some extent in quality of paper, all produced by one agency backed by sufficient capital and facilities, enabled many jobbers to issue books which they would otherwise be unable to put out, either on account of the cost or the labor. He summed up the question by saying that the advantages of a rational standardization of jobbers' catalogues are a saving in labor and time, an increase in quality, with a decrease in the cost, and that a jobber can standardized his catalogue with efficiency just so far as he has standardized his business.

LEGISLATION INIMICAL TO JOBBING INTERESTS

On the subject of legislation, Secretary Fernley reported:

Legislation has affected the interests of the dealers in mill supplies in two important respects. One bill now pending in Congress which will be a subject for the consideration of the members of this association is the Stevens bill, which will make it possible for manufacturers of trade-mark and patented goods to dictate the resale price for both wholesaler and retailer. It is well understood by your secretary-treasurer that in the past, under the resale price system, the members of the association declared that they felt that the resale price was not to be regarded as a universal panacea but that the dealer should be left to make his own selling price, except where the goods were made the subject of excessive competition.

The other bill is the Wilson omnibus anti-trust bill, one provision of which would prevent the making of contracts with manufacturers for exclusive agency arrangements. It is our hope that this provision will be eliminated and that such contracts will be allowed provided that neither party is a part of any illegal combination and that exclusive agencies shall not be with the intention or purpose of restraining any one in the conduct of his business.

Both associations adopted resolutions endorsing the campaign being carried on by the National One-Cent Postage Association.

GOLF ASSOCIATION A PERMANENT ORGANIZATION

The entertainment features of the conventions were unusually complete, with golf as a principal attraction. At a meeting of the Manufacturers' and Distributors' Golf Association it was decided to make that organization a permanent one, and D. K. Swartwout was elected president; Alvin M. Smith, vice-president; and C. C. Coventry, Cleveland Tool & Supply Company, Cleveland, secretary-treasurer. At a garden party on the evening of June 16 Mr. Swartwout was presented with a loving cup, Willard Parker being the spokesman. There was much dancing, also a swimming party with diving and other contests, and concerts.

The attendance at the conventions was smaller than had been expected, many of the members having found it necessary to be at Atlantic City at the exhibition of the Railway Supply Manufacturers' Association in connection with the gathering of railroad men at that place.

French Iron and Steel Prices the Lowest

A number of the French iron and steel syndicates have recently held their annual meetings and business conditions were discussed in no encouraging strain. The same topic came up at a recent meeting of the Comité des Forges de France, which postponed its annual dinner until the fall, when the association celebrates its jubilee. It was stated at the meeting that present prices in the industry are the lowest within living memory. Export business especially is bad, which accounts for the heavy iron and steel trade being more affected than the lighter lines which manufacture mostly for the home market.

Mechanical Engineers for Public Service

Meeting Crystallizing Further What the Society May Do for Laws and Human Relations—Pulverized Coal and Boiler Specifications Conspicuous Topics

Discussions not entirely harmonious nor completed, but serving to point out with significant emphasis a larger field of responsibility and prestige for the engineer, were evoked at the spring meeting of the American Society of Mechanical Engineers by the reports of the committees on flanges and boiler specifications. Recognized engineering societies, it was pointed out, should so promote their advocacy of engineering standards which affect the public, that legislatures before enacting laws bearing upon technical matters would look to the engineering organizations for the information on which to base their course of action. The meeting was held in St. Paul, June 16 and 17, and in Minneapolis, June 18.

The discussion of the above reports, referred to committees for conclusion, hardly exceeded in interest the matter brought out by the several papers and topical discussions relating to the use of pulverized coal. Probably for the first time the results of various experiences were brought together for a comparison such that the phenomena common to all might be observed and accepted as the beginnings of a standard practice. Further distinction accrued to the meeting by reason of the interest attaching to the industries local to the Twin Cities and Duluth, the high dam, the flour milling industry, the iron ore activities of the Mesaba and the harbor at Duluth. The liberal time given to the outing side of the programme was likewise much appreciated. An even 100 availed themselves of the special train excursion from Chicago to St. Paul and nearly half that number made the trip to Duluth following the professional sessions. President Hartness, upon whom Yale was conferring the honorary degree, Master of Arts, was unavoidably absent, and Vice-President Gantt presided. At the Wednesday morning session reports of the acceptances of the amendments to articles of the constitution, raising the requirements for active and associate membership, were made by the secretary. A further amendment to article C-45 was offered, proposing that the committee on standardization be added to the standing committees instead of being a temporary committee.

STANDARD FOR FLANGES

The report with reference to the work of the committee on standards for flanges and flange fittings indicated that this work had been completed and accepted by the council in every particular except the choice of a name for the new standard. The choice lay between the U. S. Standard of 1915 and the American Standard. Those who advocated the name American sought to avoid any confusion with the U. S. Standard of 1913, which is now in service. The advocates for the retention of the letters U. S. in connection with the standard schedules maintained that the significance of these letters had to do with a proper crediting of effort in connection with the working out of the standards by the United Societies—that this name has been accepted and that it is essentially improper at this time to consider any other name. The particular adherent to the name U. S. Standard is the National Association of Master Steam and Hot Water Fit-

ters which was represented by Edward Denny. By motion of Henry Hess the matter of name was referred to a committee made up of appointees from each organization interested.

UNIFORM STATE BOILER SPECIFICATIONS

Consideration of the report of the committee on boiler specifications was confined to a discussion of the handling of this report and, by instruction of the chair, did not bear on the subject matter of the report at all. The situation was presented briefly by John A. Stevens, Lowell, Mass.; Thos. E. Durban, general manager Erie City Iron Works, Erie, Pa.; P. E. Carhart, metallurgist, Illinois Steel Company, and Prof. D. S. Jacobus, advisory engineer, Babcock & Wilcox Company, New York City. Mr. Stevens, speaking as a member of the committee for the report, which greatly resembles the Massachusetts State requirements, simply explained that the boiler maker is now contending with a situation, which demands different specifications in practically every state, with the result that the same boiler can hardly be sold in any two states and that to build up a stock of boilers for the trade is impossible because of the variety of requirements to be met. He pointed out that the situation demanded, at the earliest possible date, a uniform law. The report is offered as a basis for such uniform legislation and in its present form was presented for criticism of any one with no other injunction than that whatever action is taken upon it should be taken speedily.

Mr. Durban and Prof. Jacobus each pointed out the advantage to the manufacturer of uniform laws and their immediate necessity. They also stated that the manufacturers had been brought to an agreement upon this report to an extent never before attained; that furthermore at least eight and probably more state legislatures were just now on the eve of enacting new laws covering boiler specifications; that they were in a receptive mood for a report such as the committee had prepared, and that the failure of the society to accept this report at once would make necessary the subsequent undoing of much legislation which, by prompt action, might be properly and satisfactorily drafted. Oliver Crosby, American Hoist & Derrick Company, St. Paul, representing the manufacturers of the vertical boiler; E. A. May, American Radiator Company, Chicago, representing the cast-iron heating boiler, and William H. Boehm, Fidelity & Casualty Company, New York City, representing the insurance interests and also as one of the committee on boiler specifications, urged similar considerations.

Mr. Carhart spoke for the Steel Plate Manufacturers' Association, and called attention simply to the necessity for the provisions of the report being of a practical and workable character so far as they referred to the materials of construction. He indicated that a visit to the plate mills by representatives of the committee would make plain to them that some of the demands regarding the boiler materials could not be met. He suggested the holding of a meeting in the fall at which the committee's report might be dealt with in detail by representatives of the various interests involved.

HEARING ON BOILER REPORT IN SEPTEMBER

Vigorous opposition to the proposal speedily to accept a report back of which the American Society of Mechanical Engineers would stand without collaboration with any of the other engineering societies having a substantial interest in the same matter was led by Henry Hess. He pointed out that some others of these societies had not been consulted and that unquestionably there would arise a decided opposition to a strictly A. S. M. E. report when subsequently that report should be offered as the basis for legislative action. Mr. Hess maintained in the interest of prompt and final action and in the interest of the acceptance of such a report by the legislatures that it should have the united sanction of all the engineering societies. He pointed out that a difference of opinion as to the report between two equally qualified engineering societies would discredit the entire report in the minds of the legislators. It was at this time that Mr. Hess pointed out the advantage of the engineering societies offering their report so that the time would come when legislatures would naturally look to these reports as a basis for legislation upon technical matters.

On motion by Prof. Jacobus the committee which prepared the report on boiler specifications presented the following resolution, which was subsequently ordered by the meeting:

Resolved, that on September 15, 1914, the committee hold in the rooms of The American Society of Mechanical Engineers, 29 West Thirty-ninth street, New York City, a hearing of all interests concerned on the preliminary report of the committee appointed To Formulate Standard Specifications for the Construction of Steam Boilers and Other Pressure Vessels and for Care of Same in Service and that those desiring to participate in the discussion present in writing their criticisms and suggestions prior to August 15, 1914.

Resolved, that in addition to invitations, notification by publication in the technical press be given of the hearing.

THE USE OF PULVERIZED FUEL

The consideration of the use of pulverized coal was opened by the presentation of a paper by Prof. R. C. Carpenter, Cornell University, entitled "Pulverized Coal Burning in the Cement Industry." In connection with the narrative of the development of burning pulverized coal in the cement industry, the author points out the general principles which control the process, together with a brief description of the machinery required. A feature of the paper is a set of drawings of a pulverizing plant, prepared by the Lehigh Car Wheel & Axle Company, having a capacity of 8 tons per hour. This paper was followed by one on "Pulverized Coal for Steam Making," by F. R. Low, editor of *Power*, which paper was largely historical in character, dealing with the types of apparatus used in the many attempts to burn pulverized coal as a fuel under boilers. The author concludes that the overall advantage of using pulverized coal for steam making over the less expensive stoking methods in common use remains to be proved. An abstract of a paper contributed jointly by William Dalton, chief engineer, American Locomotive Company, and W. S. Quigley, Quigley Furnace & Foundry Company, New York, was read relating to heating and forging furnaces installed at works of the American Locomotive Company, Schenectady, N. Y., and burning pulverized coal. The paper deals with the rebuilding of furnaces which accompanied a change over from oil as fuel to pulverized coal and presented a number of tabulated statements of the cost of operation and production. The general field covered by the above papers was set out in more detail as to the special requirements of using pulverized coal by a series of topical discussions which were presented

in abstract. The considerations involved in the use of pulverized coal as developed from these several parallel experiences have been tabulated in a general way from these discussions on pages 1604 and 1605.

FALL MEETING ON PUBLIC RELATIONS

Preceding adjournment at the Wednesday morning session, Secretary Calvin W. Rice, commenting upon the suggestion that the money now used for the printing of proceedings be diverted to the several channels of new effort that the society is undertaking, spoke of the excellent library maintained in New York and the service which the library bureau is undertaking to render to members. He also called attention to the fact that the society has accepted the invitation of the committee on public relations to conduct the fall meeting. This programme will be very much in harmony with the feeling developed at the spring meeting that the usefulness and responsibility of the engineer in public affairs is daily increasing. Secretary Rice also announced that 175 foreign societies had already sent acceptances of the invitation to visit the United States next year and that there was now before the members and local sections of the society the immediate necessity for preparing for local receptions as these foreign societies traversed the country on their way westward.

INDUSTRIAL SERVICE WORK

At the afternoon session the paper by Prof. Joseph W. Roe, published in *The Iron Age* of June 18, concerning "Industrial Service Work in Engineering Schools," of which he is the father, commanded particular attention. The purpose of this service work is distinguished from efforts in the direction of welfare work. By bringing the student and the young engineer in contact with the uneducated class of employees, a better understanding is given to the young men, who will subsequently occupy executive positions, of the viewpoint of the workman, while on the other hand, the workman is brought to a realization that his employers have a personal interest in him aside from the one of a day's work for a day's wage. L. P. Alford, speaking in behalf of Professor Roe, suggested that in addition to the visits made by Secretary Rice that a member representative of the society be appointed to make occasional visits to the student branches. Prof. Perley F. Walker, University of Kansas, commented upon the work described in this paper as especially applicable to schools in large cities. The college in the small town has little or no opportunity for similar undertakings.

Mr. Gantt took occasion to point out with emphasis that Professor Roe's paper had an importance not generally realized, that employer and employee do not yet understand each other nor the possibilities for direct dealing that lie in such an understanding. Nothing in industry is more important than the effort to improve the relation between employer and employee. This service work, he said, is an important subject; its results will make for a greater appreciation of the human element involved in the management of business. Mr. Gantt stated that the flaw in the present development of industrial management lies in the attempt to build up unified and harmonious systems out of parts chosen from various experiences, but without any natural fitness one to the other. It was pointed out that this paper offers a suggestion of something for each manufacturer to apply instead of leaving the work for some college to undertake.

In connection with the reading of the paper of

(Continued on page 1604)

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Depression Here and Abroad

According to dispatches from Washington, the advisers of the President persist in endeavoring to make him believe that the depression in trade in this country has been much less than in foreign countries, especially in Germany. It is difficult to see on what such statements as these can be predicated. Taking the condition of the iron and copper trades, the statistical comparisons available are of decidedly the opposite character.

While the iron trade in Germany has been depressed, the production of pig iron for the first five months of this year was 7,756,900 metric tons, which was only 209,500 tons less than the production of the corresponding months a year ago. The output in May was 1,607,000 tons, which is only 36,000 tons less than in May, 1913. In this country the production of coke and anthracite pig iron in the first five months of this year, which was 10,484,232 gross tons, was 3,235,977 tons less than the production in the first five months of 1913. The output for May showed a falling off of 729,531 tons as compared with May, 1913. The showing thus made by Germany is certainly far better than that made by the United States.

Turning to the copper statistics, the reports of the Copper Producers' Association show that for the first five months of this year the quantity of copper delivered to domestic consumers fell off 76,323,387 lb., as compared with home deliveries for the first five months of last year, while the shipments to foreign consumers, almost entirely in European countries, for the five months ended May 31 were 52,040,164 lb. greater than the shipments for the corresponding months of last year. Evidently the European copper trade is in much better condition than that of this country.

These figures are, of course, not intended to be exhaustive but are merely given as indications that European trade has not been so seriously curtailed as that of the United States. The advisers of the Administration are making assiduous efforts to extract sunbeams from cucumbers.

Good Times as a Political Issue

If there are many who believe what some hysterical persons at Washington have been saying in the past week, a very active campaign should begin at once to establish it beyond dispute that the country is really prosperous. Those persons who have been telegraphing President Wilson to go ahead with every proposal for hampering and harry-

ing business, assuring him that honest industry is not suffering, should head a movement to make the prosperity they are enjoying so sweeping and so palpable that no one could deny it. To offset the alleged conspiracy "to put on the brakes and slow up business in every way possible," they should plan at once, if perchance any of them are manufacturers, to make extensions to plant; their purchases of every form of raw material should be increased; the wages of their employees should be raised—everything, in fact, should be done to show entire confidence in the results flowing and to flow from laws recently passed and to be passed, and at the same time to overwhelm the malefactors and conspirators in the tidal wave of abundant business.

It is plain that good business and bad business will be the burden of charge and countercharge in the coming Congressional campaign. There will be a riot of misrepresentation of industrial conditions. One compensation, and only one, will be found in whatever the administration supporters may be able to do in producing the good times they now vehemently assert. Just now there is some clashing. The claim that business is good somehow breaks the force of the admission that industry must expect to be hurt by the readjustment from the old bound condition to the new freedom and unbinding; it is also inconsistent with the charge of a depression produced by conspiracy. But saying nothing of political inconsistencies, there can be no doubt that the effect of the great crops of the year will be intensified if any considerable part of the community fights for good times with half the ardor with which candidates and party policies will be supported in the fierce campaign of the next four months.

Our Foreign Trade Balances

The unfavorable balance of \$11,345,606 in our foreign merchandise trade in April and of \$1,987,183 in May are to be regarded as indicating a present trend rather than as an accentuation of a previously unfavorable condition. Our position has not yet become unfavorable, but only a few months of trade like that of April and May would make it so. Recent exports of gold were accomplished without any difficulty, and were occasioned by the need of gold abroad, while we had an enormous reserve, rather than by the necessity of settling for a merchandise trade balance.

While April and May showed an unfavorable balance in the foreign trade, the favorable balance during the nine preceding months of the fiscal year was \$484,871,737, so that the net favorable balance

for eleven months is \$471,538,948. This compares with fiscal year balances as follows, beginning with 1908, which holds the record to date:

1908.....	\$666,431,554	1911.....	\$522,094,094
1909.....	351,090,880	1912.....	551,057,475
1910.....	188,037,290	1913.....	652,875,915

With trade balances averaging \$575,000,000 a year for three years and a favorable balance of \$471,538,948 in eleven months following, our position is thus far strong, but the returns of the past two months are not assuring. The unfavorable balance in April was the first for any month since August, 1910. The largest continuous unfavorable balance in many years was that of February, March and April, 1910, totaling \$26,000,000. Two and a half months with such a showing as that of April would break all records for recent years. To the unfavorable balance in April and May large imports and small exports contributed about equally. Few months have shown as large imports as the average for these two, while few months in recent years have shown as small exports. For the large imports the new tariff cannot escape responsibility. With trade as dull as it has been, imports would normally be small rather than large. For the relatively small exports the tariff can hardly be held accountable, the trade depression abroad being a very natural cause.

With the present unfavorable trend in our foreign commerce there is no comfort in the fact that lately our favorable trade balances have been large. It is an elementary economic law that departures from the normal in trade balances correct themselves by the heroic process of advancing or reducing all prices in the country involved. If a country's trade balance becomes very large its stock of gold increases and its prices so advance that outside countries will not buy so much of its goods, while they do send more of their goods into it. If the trade balance swings in the other direction, gold is drained out, prices fall, less merchandise can be imported, and low prices permit more to be exported. The operation of the law in this respect is as cruel as it is effective. There is no connection between the reduction in the cost of living, which was promised by the framers of the present tariff, and the reduction in prices which would be caused by the establishment of an unfavorable trade balance. The most impractical of the doctrinaires would hardly advocate a reduction in the cost of living by draining a country of its liquid resources in order to reduce the selling prices of commodities.

Physical Examination of Workmen

The operation of workmen's compensation acts is tightening about the owners of industrial plants in such a serious way as to create a constantly increasing interest in the question of the compulsory physical examination of employees. The original understanding of the principles of law involved in compensation was that they applied only to actual accidents. If a man sustained a physical injury in some violent way during his employment, the owner would be financially responsible, no matter where the blame might be placed.

Recent developments have put an entirely different light on the situation. The various State

compensation acts are very much alike in so far as they prescribe the application of the principle. Consequently a recent Massachusetts decision should have an important influence on many cases which will arise in the near future in other States. This decision, handed down by the full bench of the State supreme court, states that "personal injury under our act includes any injury or disease which arises out of and in the course of the employment, which causes incapacity for work and thereby impairs the ability of the employee for earning wages."

The details of this case, which is an appeal from a decision of the Industrial Accident Board, are significant because they illustrate what may be expected in future practice under workmen's compensation. The board had found that the employee, since March 13, 1913, had been totally incapacitated for labor because of his physical condition, due to the results of lead poisoning, and that this is an injury which arose out of and in the course of his employment. The employee is 72 years of age, and was employed as a lead grinder continuously for more than 20 years before the date given. The board further found that he had suffered from lead poisoning 14 years before, but apparently had recovered and had had no recurrence of the disease until in 1913 he became ill and was totally incapacitated. It further appeared from the report of the accident board that "for 20 years in his occupation he had been absorbing lead poisoning, which had been stored up in his system, and which absorption continued for eight months after the act went into effect, when, elimination failing, the poison stored up manifested itself in the personal injury and the incapacity which resulted therefrom."

The important question which was raised by the appeal was whether the employee suffered a personal injury within the meaning of the act. The supreme court held:

Under the act, personal injury is not limited to injuries caused by external violence, physical force, or as the result of accident in the sense in which that word is commonly used and is understood; but under the statute is to be given a much broader and more liberal meaning and include any bodily injury. In this respect the English workmen's compensation act differs from ours, because that act applies only to "personal injury by accident."; yet since the passage of that act its scope has been much enlarged by including certain industrial diseases. . . . It is clear that "personal injuries" under our act include any injury or disease which arises out of and in the course of the employment, which causes incapacity for work and thereby impairs the ability of the employee for earning wages.

The medical men who have been closely in touch with the operation of workmen's compensation are practically a unit in the belief that compulsory physical examination is very important, not only from the standpoint of the owner but also from that of the workman. If an owner is compelled to pay damages for injuries due to accident it is only fair that he should insist that his employees be physically fit for the tasks to which they are assigned. Poor eyesight or restricted sense of hearing or a heart weakness are not conducive to safety where there is machinery or other elements of physical danger. And if vocational diseases are

to be included the owner has the moral right to select for his workmen those who have sound bodies and constitutional strength which combine to afford the greatest possible resistance to disease. To refer again to the Massachusetts case, considerable speculation has arisen as to what is included under "any injury or disease which arises out of and in the course of employment." The contagious diseases, pneumonia, affections caused by intense heat such as is frequently felt in the summer, and other serious troubles may come under this definition. Several meetings of physicians who are regularly employed by large corporations in caring for the welfare of their employees have been held recently. This general subject was given serious consideration and it was agreed that physical examination will be established eventually as an almost universal institution. This would not mean that great numbers of men would be unable to get employment, but rather that most men willing to work would have employment suited to their physical condition.

To consider the matter from the workman's viewpoint, he would probably benefit even more than his employer. If he has a bodily infirmity which increases the danger of his occupation he should know it; and in very many cases he is ignorant of his condition or else belittles the possibility of actual resulting danger, and the probability that a continuance of the occupation may seriously shorten the period of his earning power. If he is compelled to readjust himself so that his labor fits his physical capacity, in the long run it will be better for him and for those dependent upon him. Take the man who works in lead. The microscope instantly exposes the presence of lead poisoning by revealing its action upon the blood. If he knows in time he can be easily cured. If he waits too long the consequences are very serious—his earning capacity has gone for a long time, perhaps forever. A man with a heart weakness is tempting fate if he continues to labor where the heat is extreme or where physical exertion is great.

The records of plants where the system has been established show numerous cases where the discovery of infirmities has resulted most advantageously to the men.

Westinghouse Strike Unsettled

On Monday, June 22, indications were fairly bright for a settlement of the strike at the plants of the Westinghouse Electric & Mfg. Company, the Westinghouse Machine Company and the Pittsburgh Meter Company at East Pittsburgh, and the Union Switch & Signal Company at Swissvale, Pa., but the developments of Tuesday were unfavorable, and indications are at this writing that the strike may be long drawn out and may not be settled for some time. On Tuesday afternoon, June 23, E. M. Herr, president of the Westinghouse Electric & Mfg. Company, met a committee of the strikers in East Pittsburgh and the conference continued for several hours, but nothing looking toward a settlement of the trouble was done.

All of the plants are being operated only to part capacity. On Monday the Westinghouse Electric & Mfg. Company posted notices at its works that the men would be paid off on Tuesday, and must remove their tools from the shops. It is said the Westinghouse interests are opposed to bringing in outside men, as the belief still exists that the trouble may be settled without resorting to this measure.

CORRESPONDENCE

Pacific Coast Rolling Mills Hard Hit by Low Tariff

To the Editor: We have been close observers of the subject matter of the effect of the present tariff on the iron and steel market in your publication, and we wish to give you some facts and figures as this affects and applies to conditions on the Pacific Coast.

During the full 12 months prior to the date of the present tariff bill, there was imported into Seattle 826 tons, consisting of bar iron, bar steel, angles and shapes, while during nine months' operation under the present tariff the port of Seattle alone has received 3332 tons, consisting of the same classes of material. Foreign steel is being sold at \$1.30 to \$1.35 per cwt., duty paid, delivered on the dock Seattle, while the lowest price which Eastern mills have been able to make for delivery to Seattle, water shipment, is \$1.65 per cwt. The mills on the Pacific Coast located at Seattle, San Francisco and Los Angeles have been able to meet the Eastern competition only, and have made their prices equal to the Eastern prices, while they have not been able to do anything better, or anything toward offering competition which would prevent the purchase of these foreign bars.

The mills on the Coast are operating less than 50 per cent. of capacity, and as all of these plants are located on tidewater, where they have no protection in a rail haul after this foreign material is delivered to Pacific Coast terminal points, they are hit much harder than industries on the Atlantic Coast, which are situated some distance from tidewater, as on the Pacific Coast nearly all of the local mill products are consumed by the coast cities, as the territory inland from the coast is but sparsely settled and their requirements are very light. Inasmuch as nearly all the product here is made very largely from scrap which accumulates locally, no raw material is required which is imported and on which the duty has also been reduced; consequently Pacific Coast points, while being hit very hard by the present reduction in duty, receive no benefit from any cheaper raw materials.

The situation does not look encouraging to the manufacturer of iron and steel bars on the Pacific Coast, and we are living now principally on hopes that the results of the operation of the present tariff will soon convince the proper authorities that operating less than half time while we are watching the large liners unload steel at our door does not offer much encouragement to our workmen for a full dinner pail.

As an example of the different attitude taken by our near Canadian neighbors, in Victoria and Vancouver, on whom we depend to take part of our product, within the past 90 days new improvements being made at these points required 6300 tons of reinforcing steel, principally in public improvements. Our product entering Canada is subject to a duty of \$7 per ton. And not being content with this protection the authorities at these points also had a clause attached to the specifications providing that nothing but Canadian steel would be used in this work. We went there prepared to make a bid on this material, hoping, on account of being able to make very quick deliveries, to secure at least part of this business, but were prohibited from bidding on account of the clause mentioned.

We have no information yet as to how much lower the rates will be from Europe when the Panama Canal is in operation, which would reduce the price of foreign bars still lower at our port, but we feel reasonably sure that the rates will be lower, consequently we cannot see any bright spots in the immediate future.

SEATTLE, WASH., June 19, 1914. T. S. CLINGAN,
Manager Seattle Works,
Pacific Coast Steel Company.

G. Fred Pearson, Halifax, N. S., has been appointed liquidator of the Canadian Venezuelan Ore Company.

Changes in Steel Specifications

The Association of American Steel Manufacturers has just published revisions as of April 21, 1914, of the three following specifications: Structural and Boiler Steel, Concrete Reinforcement Bars Rolled from Billets, and Rail Steel Concrete Reinforcement Bars. In the structural and boiler steel specifications the principal changes are the narrowing of the tensile range for firebox steel, making it 52,000 to 60,000 lb. instead of 52,000 to 62,000 lb., and the addition of tables covering permissible variations in gauge and weight of sheared plates. These tables replace those which were adopted by the association in 1896 and which have since been widely copied into nearly all plate specifications. The present tables refer to individual plates rather than averages and the subdivision as regards width particularly is carried out in much more detail than in the old tables.

In the specifications for concrete reinforcement bars rolled from billets an intermediate grade of bars with a tensile strength of 70,000 to 85,000 lb. has been introduced. Previously there were but two grades—the "structural steel" grade, with tensile range from 55,000 to 70,000 lb., and the "hard" grade with a minimum tensile strength of 80,000 lb.

In the revised specifications for rail steel concrete reinforcement bars slight changes have been made in Section 5, referring to number of tests. The old paragraph read as follows:

A complete physical test shall be made, by an approved testing laboratory, of each size of bar to be applied by the manufacturer on the contract from each ten ton lot or less. Should a test specimen develop flaws, or should the tensile test specimen break outside of the middle third of its gauge length, it may be discarded and another test specimen substituted therefor. In case a tensile specimen does not meet the specifications, an additional test may be made.

The new paragraph, which replaces the above, is given below:

One tensile and one bending test shall be made from each lot of ten tons or less of each size of bar rolled from rails varying not more than 10 lbs. per yard in nominal weight. Should a test specimen develop flaws, or should the tensile test specimen break outside of the middle third of its gaged length it may be discarded and another test specimen substituted therefor. In case a tensile specimen does not meet the specifications, an additional test may be made.

Becker Steel Company Buys Baldwin Plant

The plant and equipment of the Baldwin Steel Works, Charleston, W. Va., has been purchased by the Becker Steel Company of America, 90 West street, New York, and will be used for the manufacture of tool steel, alloy steels and high carbon chrome steel tubing for ball and roller bearings. The negotiations were closed by Reinhold Becker, head of the Stahlwerk Becker, Willich, Germany, who returned to Germany June 15. William Peters, president of the Becker Steel Company of America, which is a subsidiary of the German company, is to head the new organization. It is planned to add an open-hearth furnace to the present equipment to work in conjunction with an electric steel furnace. For a time the material used will be German billets in order to insure a continuance of the grade of products which the Becker company handles. This will be made more certain by the guidance of the works manager of the Stahlwerk Becker who will come here to superintend operations at the start.

The works and machinery are in good condition, having been operated but little since first starting some years ago. The principal owner then was the late Samuel W. Bowne, of Scott & Bowne. The plant was built to manufacture crucible steels. In 1912 a company was formed to operate the plant and this interest now passes the property to the Becker Steel Company. Some changes will be necessary, such as the modernizing of the annealing plant. There are two rolling mills, six steam hammers, two crucible furnaces with a total capacity of 54 pots, a laboratory and clay pot plant. The boilers are all gas-fired, one of the features of the location being the cheap natural gas fuel. Producer gas coal can be had also at low cost. The

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property covers 16½ acres bordering the Kanawha River, which affords water transportation. Two railroad spurs enter the yard. The company will be financed by an issue of \$500,000 stock and \$500,000 in bonds.

No Prosperity in Australian Rail Order

At the Cabinet meeting at Washington on Friday, June 19, Secretary Redfield cited as an indication that the steel trade was not depressed under the new tariff, the fact that the Maryland Steel Company had taken an order for 16,000 tons of rails for Australia. The *New York Times* wired John C. Jay, Jr., Philadelphia, general manager of sales of the Pennsylvania Steel Company, calling his attention to Secretary Redfield's interpretation of the Australian contract and received the following:

"Replying to your telegram of the 19th: The order for rails for Australia to which you refer will keep our rail mills occupied for 10 days. The order is unsuited to our mills, both in specifications and weights. It was taken solely to keep our men employed.

"Our business is in a more depressed condition than in the period following the so-called panic of 1907. The tonnage on our order books to-day is less than one-fourth the tonnage of a year ago, and prices are very much lower.

"I consider the present depression in the steel industry the worst since 1896.

J. C. JAY, JR.,
"General Manager of Sales."

The Iron and Metal Markets

CONSUMPTION NO GREATER

Lower Prices Bring Out Some Forward Buying

Further Curtailment Likely in Pig-Iron Production—More Rail Buying

June buying of steel products, though considerably increased over the poor business in May, has not met the expectations of the more hopeful in the trade. Prices have been even less satisfactory than volume, greater concessions by sellers coming in the past week than in those preceding.

The additions to order books have been chiefly for third quarter delivery, though in implement bars, which have contributed an important part of the new tonnage, deliveries extend through the year. There is no indication in the business of the month that the country's consumption of iron and steel is increasing. In the Chicago district some mills have taken contracts at the new low prices of June with the proviso that specifications be given for early shipment of a portion of the order.

Merchant blast furnace operations, which gauge the demand for a wide variety of foundry products, are on a diminishing scale. A number of furnaces in Pennsylvania and Ohio will be blown out in the next fortnight. At an American Pig Iron Association meeting at Youngstown this week reports were discouraging, the second quarter of the year showing an aggregate of losses quite as serious as for the first quarter. It was stated that the large sales of pig iron in recent weeks were to a minority of consumers and were made at bargain prices.

Mid-year rolling mill shutdowns, which begin next week, are likely to last longer than usual, with business as slack as it is today. A number of union sheet mills may be idle until late in July in view of the wage scale disagreement at Atlantic City. At the low prices lately made sheet manufacturers are calling for wage concessions; at the same time those with lowest costs have made good sales. One large maker entered more orders and specifications last week than in any week since January.

The railroads continue to dole out business in a careful way. Their attitude as to requirements that may be released when a rate advance is granted makes the steel trade less inclined to think of the decision as a turning point. There has been a fair run of rail orders. The St. Louis & San Francisco receivers placed 32,000 tons with the Alabama mill; the Boston & Maine, 5000 tons with the Pennsylvania Steel Company; the Pennsylvania Railroad, 5000 tons with the Cambria Steel Company, and the Buckhannon & Northern 1000 tons with the Carnegie Steel Company. A South American inquiry is for 15,000 tons, and Siam has bought 10,000 tons from this country.

The Illinois Central's car order has been increased by 2000; the Seaboard has placed 485 cars, and the Merchants' Dispatch will build 2000 at its East Rochester shops. The Wabash will buy 1500 cars and 60 locomotives and the Kansas City Southern 40 locomotives.

Plate mills, in the scramble for tonnage, have made new cuts. An Eastern order went at 1.05c, Pittsburgh, and this price was duplicated on some attractive Central Western business. For a Western water line 5000 to 6000 tons is under inquiry.

Structural contracts of the week indicate unusual activity of a large interest, and prices are monotonously low. The William Penn Hotel at Pittsburgh, 8000 tons, was finally placed, and at Chicago the municipal pier, 7000 tons, is again active. In several cases lately advantageous rollings of shapes and plates have brought out prices under 1.10c Pittsburgh, and at Chicago 1.25c has been done on ordinary business.

Steel making and foundry pig irons have been a little more active in the Pittsburgh district, but in other sections the volume is generally less. The Southern market has not broadened and prices have sagged further, as low as \$10 for No. 2 being reached on some third quarter business.

The East River tunnel segments have been awarded at prices surprisingly near the \$26 basis of the Hudson tunnel segments of the late nineties; yet labor and materials are much higher than then. The pig iron, about 70,000 tons, deliveries over two years, goes to Buffalo and Shenango Valley furnaces.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

	June 24,	June 17,	May 27,	June 25,
Pig Iron, Per Gross Ton:	1914.	1914.	1914.	1913.
No. 2 X, Philadelphia...	\$14.75	\$14.75	\$14.75	\$16.00
No. 2, Valley furnace...	13.00	13.00	13.00	14.00
No. 2 Southern, Cin'ti...	13.50	13.50	13.75	13.75
No. 2, Birmingham, Ala.	10.25	10.25	10.50	10.50
No. 2, furnace, Chicago*	13.75	13.50	14.00	15.00
Basic, del'd, eastern Pa.	14.00	14.00	14.00	15.50
Basic, Valley furnace...	13.00	13.00	13.00	14.50
Bessemer, Pittsburgh...	14.90	14.90	14.90	16.90
Malleable Bess., Ch'go*	14.00	13.75	14.00	15.00
Gray forge, Pittsburgh...	13.65	13.65	13.65	14.65
L. S. charcoal, Chicago...	15.75	15.75	15.75	16.25
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh...	19.00	19.50	20.00	26.50
O.-h. billets, Pittsburgh...	19.00	19.50	20.00	26.50
O.-h. sheet bars, P'gh...	20.00	20.50	21.00	27.00
Forging billets, base, P'gh.	25.00	25.00	25.00	34.00
O.-h. billets, Phila....	22.40	22.40	22.40	28.00
Wire rods, Pittsburgh...	24.50	24.50	24.50	29.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	12.75	12.75	12.75	14.00
Iron rails, Philadelphia...	15.00	15.00	15.00	17.50
Carwheels, Chicago.....	11.50	11.50	11.50	13.50
Carwheels, Philadelphia...	11.00	11.25	11.75	13.00
Heavy steel scrap, P'gh.	11.50	11.50	11.50	12.50
Heavy steel scrap, Phila.	10.50	10.50	10.75	11.50
Heavy steel scrap, Ch'go	9.75	9.75	9.50	10.50
No. 1 cast, Pittsburgh...	11.50	11.50	11.50	12.75
No. 1 cast, Philadelphia...	12.00	12.00	12.00	13.00
No. 1 cast, Ch'go (net ton)	9.75	9.75	10.00	10.25

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.17 1/2	1.17 1/2	1.20	1.47 1/2
Iron bars, Pittsburgh...	1.25	1.25	1.25	1.65
Iron bars, Chicago.....	1.05	1.05	1.10	1.50
Steel bars, Pittsburgh...	1.10	1.10	1.12 1/2	1.40
Steel bars, New York...	1.26	1.26	1.28 1/2	1.56
Tank plates, Pittsburgh...	1.10	1.10	1.10	1.45
Tank plates, New York...	1.26	1.26	1.26	1.61
Beams, etc., Pittsburgh...	1.10	1.10	1.12 1/2	1.45
Beams, etc., New York...	1.26	1.26	1.28 1/2	1.61
Skelp, grooved steel, P'gh	1.15	1.15	1.20	1.45
Skelp, sheared steel, P'gh	1.20	1.20	1.25	1.50
Steel hoops, Pittsburgh...	1.25	1.25	1.25	1.60

Sheets, Nails and Wire,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.80	1.80	1.85	2.25
Galv. sheets, No. 28, P'gh	2.75	2.75	2.75	3.35
Wire nails, Pittsburgh...	1.50	1.50	1.55	1.80
Cut nails, Pittsburgh...	1.55	1.55	1.60	1.70
Fence wire, base, P'gh...	1.30	1.30	1.35	1.60
Barb wire, galv., P'gh...	1.90	1.90	1.95	2.20

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,

	June 24, 1914	June 17, 1914	May 27, 1914	June 25, 1913
Per Net Ton at Oven:	1914.	1914.	1914.	1913.
Furnace coke, prompt...	\$1.75	\$1.75	\$1.75	\$2.10
Furnace coke, future...	1.85	1.85	1.90	2.25
Foundry coke, prompt...	2.30	2.30	2.40	2.75
Foundry coke, future...	2.50	2.50	2.50	3.00

Metals,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	14.12½	14.12½	14.37½	15.00
Electrolytic copper, N. Y.	13.75	13.87½	14.12½	14.50
Spelter, St. Louis.	4.99	4.95	4.95	4.95
Spelter, New York.	5.05	5.10	5.10	5.10
Lead, St. Louis.	3.80	3.80	3.80	4.22½
Lead, New York.	3.90	3.90	3.90	4.35
Tin, New York.	30.75	30.05	33.25	44.10
Antimony, Hallett's, N. Y.	6.75	6.87½	6.80	8.15
Tin plate, 100-lb. box, 17" gh	\$3.30	\$3.30	\$3.30	\$3.60

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.10c. to 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	10
Gauges under 3-16 in. to and including No. 8.	15
Gauges under No. 8 to and including No. 9.	25
Gauges under No. 9 to and including No. 10.	30
Gauges under No. 10 to and including No. 12.	40
Sketches (including straight taper plates), 3 ft. and over	10
Complete circles 3 ft. in diameter and over	20
Boiler and flange steel	10
"A. B. M. A." and ordinary firebox steel	20
Still bottom steel	30
Marine steel	40
Locomotive firebox steel	50
Widths over 100 in. up to 110 in., inclusive	05
Widths over 110 in. up to 115 in., inclusive	10
Widths over 115 in. up to 120 in., inclusive	15
Widths over 120 in. up to 125 in., inclusive	25
Widths over 125 in. up to 130 in., inclusive	50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive	25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.10c. to 1.15c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	10
H-beams over 18 in.	10
Angles over 6 in. on one or both legs	10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909.	70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).	05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	20 to 80
Deck beams and bulb angles.	30
Hand rail tees.	75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.30 to \$1.35; galvanized, \$1.70 to \$1.75. Galvanized barb wire and fence staples to jobbers, \$1.90 to \$1.95; painted, \$1.50 to \$1.55. Wire nails to jobbers, \$1.50 to \$1.55. Woven wire fencing, 73½ per cent. off list for carloads; 72½ off for 1000-rod lots; 71½ off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	\$1.50	\$1.55	\$1.60	\$1.65	\$1.75	\$1.85	\$1.95	\$2.05
Galvanized	1.95	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Wire Rods.—Bessemer, open-hearth and chain rods, \$24.50 to \$25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1½, 2 and 2½	73	82½	1½ and 1½	66	47
2½ to 3	77	86½	2½	65	46
3 to 3	80	91½	3 to 2½	69	56

Lap Weld			Reamed and Drifted		
Inches	Black	Galv.	Inches	Black	Galv.
2	77	68½	1½	56	45
2½ to 6	79	70½	1½	67	56
7 to 12	76	65½	2	68	58
13 to 15	53	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Lap Weld, extra strong, plain ends			Lap Weld, double extra strong, plain ends		
Inches	Black	Galv.	Inches	Black	Galv.
1½, 2 and 2½	68	57½	1½	57	49
2½ to 3	73	66½	2½ to 4	60	52
3 to 3	77	70½	4½ to 6	62	54
2 to 3	78	71½	2 and 2½	62	54

Lap Weld, extra strong, plain ends			Lap Weld, double extra strong, plain ends		
Inches	Black	Galv.	Inches	Black	Galv.
2	74	65½	1½	55	49
2½ to 4	76	67½	2½ to 4	60	54
4½ to 6	75	66½	4½ to 6	59	53
7 to 8	68	57½	7 to 8	52	42
9 to 12	63	52½	9 to 12	58	47

Butt Weld, extra strong, plain ends			Butt Weld, double extra strong, plain ends		
Inches	Black	Galv.	Inches	Black	Galv.
1½, 2 and 2½	68	57½	1½	57	49
2½ to 3	73	66½	2½ to 4	60	52
3 to 3	77	70½	4½ to 6	62	54
2 to 3	78	71½	2 and 2½	62	54

Lap Weld, extra strong, plain ends			Lap Weld, double extra strong, plain ends		
Inches	Black	Galv.	Inches	Black	Galv.
2	74	65½	1½	55	49
2½ to 4	76	67½	2½ to 4	60	54
4½ to 6	75	66½	4½ to 6	59	53
7 to 8	68	57½	7 to 8	52	42
9 to 12	63	52½	9 to 12	58	47

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel	Standard Charcoal Iron
1½ and 2 in.	62
2½ in.	59
2½ to 2¾ in.	65
3 and 3½ in.	70
3½ to 4½ in.	72
5 and 6 in.	65
7 to 13 in.	62
1½ in.	45
2 in.	49
2½ in.	46
3 in.	54
3½ in.	57
4 in.	60
4½ in.	60
5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2½ in. and larger, over 22 ft., 10 per cent. net extra. Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets	Cents per lb.
Nos. 3 to 8	1.30
Nos. 9 to 10	1.35
Nos. 11 and 12	1.40
Nos. 13 and 14	1.45
Nos. 15 and 16	1.55

Box Annealed Sheets, Cold Rolled	Cents per lb.
Nos. 10 and 11	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.55 to 1.60
Nos. 17 to 21	1.60 to 1.65
Nos. 22 and 24	1.65 to 1.70
Nos. 25 and 26	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.75 to 1.80
No. 12	1.85 to 1.90
Nos. 13 and 14	1.85 to 1.90
Nos. 15 and 16	2.00 to 2.05
Nos. 17 to 21	2.15 to 2.20
Nos. 22 and 24	2.30 to 2.35
Nos. 25 and 26	2.45 to 2.50
No. 27	2.60 to 2.65
No. 28	2.75 to 2.80
No. 29	2.90 to 2.95
No. 30	3.05 to 3.10

Pittsburgh

PITTSBURGH, PA., June 23, 1914.

Taken as a whole June in the steel trade is disappointing. In April and May predictions were freely made that there would be heavy buying in June. The beginning of better things has been realized to only a slight extent. The volume of orders placed is better than in any previous month this year since February, but most of the new buying represents actual needs of consumers, and only on such lines of materials as are very low in price do buyers show any desire to contract ahead. There is no improvement whatever in prices, but on the contrary, contracts for some lines of finished steel have been taken for third quarter extremely low. The statement of James A. Campbell, president of the Youngstown Sheet & Tube Company, that the business of his concern has not been profitable for the past seven months, and that there will not be any distribution of profits this year to employees, shows clearly the lean margins on which the steel works have been operating for a long time. Last year the Youngstown Sheet & Tube Company divided nearly \$300,000 in profits and the year before about \$250,000, but this year the employees will get nothing. It is now believed that even if the rate decision is favorable to the railroads, it will have very little effect in helping to improve the present unsatisfactory conditions, with the determination to pass the anti-trust bills before Congress.

Pig Iron.—There is more inquiry for basic, Bessemer and foundry pig irons than for some time, and more business is being closed up. The Wheeling Mold & Foundry Company, Wheeling, W. Va., which has taken a contract for 37,000 to 38,000 tons of segments for the East River tunnel, New York, has closed for upward of 35,000 tons of Northern No. 2 foundry iron with a local interest, deliveries extending over the next two years. It is understood that the price graduates, advancing so much per ton with each advance in the local market. The New York Car Wheel Company, which also took a contract for 37,000 tons of segments, is believed to have closed with Buffalo interests for about 35,000 tons of foundry iron, deliveries running over two years. A local steel casting company is in the market for 1500 tons of Bessemer iron for last quarter, and a Midland, Pa., interest for 3000 tons for third quarter. A local open-hearth interest has an inquiry out for 2000 to 3000 tons of Bessemer iron for third quarter. Some good inquiries are out for foundry iron and also for basic, and the local pig-iron market is showing more activity than for some time. We note sales of 2500 to 3000 tons of Bessemer iron for third quarter at \$14, Valley; 6000 tons of basic iron for Eastern delivery; 1000 tons of No. 2 foundry at \$13.50, Valley, and one of 2000 tons for third quarter at \$13, Valley. We quote Bessemer at \$14, basic, \$13; malleable Bessemer, \$13 to \$13.25; Northern No. 2 foundry, \$13 to \$13.50, and gray forge \$12.75, all at Valley furnace, with a freight rate of 90c. a ton for Cleveland or Pittsburgh delivery.

Billets and Sheet Bars.—New demand for steel is still very dull, most consumers being loaded up for some time ahead and specifications against contracts being only fair. Prices on both billets and sheet bars are weak, and none of the steel mills that furnish billets and bars in the open market is running to more than 50 to 60 per cent. We quote Bessemer and open-hearth billets at \$19 to \$19.50, and Bessemer and open-hearth sheet bars at \$20 to \$20.50, f.o.b. maker's mill, Pittsburgh or Youngstown districts. A sale is re-

ported of 500 tons of sheet bars at \$20, Youngstown mill. We quote forging billets at \$25 for desirable orders of one size and up to but not including 10 x 10 in., regular extras being charged for larger sizes. On carload orders forging billets are held at \$25. We quote axle billets at \$23 for desirable orders and \$24 for small lots, f.o.b. Pittsburgh.

Ferroalloys.—Most consumers are covered ahead over practically all this year and there is very little new buying in either ferromanganese or ferrosilicon. Some lots of re-sale ferromanganese are being offered at about \$37.50, Baltimore, and we note several sales of carload lots at that price; also several carload lots of ferrosilicon at the full price of \$73, delivered. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; over 600 tons, \$71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is \$19; 11 per cent., \$20, and 12 per cent., \$21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Muck Bar.—The local market is lifeless and in the absence of sales we quote best grades of muck bar, made from all pig iron, at nominally \$27, Pittsburgh.

Structural Material.—New inquiry has been fair. The American Bridge Company has taken about 8000 tons for the William Penn Hotel, this city, which later may be increased to upward of 10,000 tons; also a laundry building for the Fort Pitt Hotel, this city, 1000 tons, and the Telegraph-Gazette building in this city, 1400 tons. It is said very low prices were made on the steel work erected. The McClintic-Marshall Company has 250 tons for a steel bridge for the Pennsylvania Railroad at Baltimore, and 300 tons for a pattern storage building for the Verona Steel Casting Company, Verona, Pa. The John Eichleay, Jr., Company has taken 450 tons for a new market house building in this city. We quote beams and channels up to 15 in. at 1.10c. for desirable orders and prompt shipment, and 1.15c. on small orders, f.o.b. Pittsburgh.

Plates.—The inquiry of the Erie Railroad for 800 gondolas has not been placed, and the New York Central has another inquiry out for 1000 hopper and gondola cars for the Pittsburgh & Lake Erie Railroad. A local interest has taken a contract for a large water line in the West which will take 5000 to 6000 tons of plates, but details have not been given out. The current demand for plates is quiet and none of the plate mills is running to more than about 50 per cent. We quote ¼-in. and heavier plates at 1.10c. to 1.15c., f.o.b. mill, Pittsburgh.

Steel Rails.—The Cambria Steel Company, Johnstown, Pa., has taken 5000 tons of standard sections for the Pennsylvania railroad, 5000 tons for the Chicago, Milwaukee & St. Paul and smaller orders for about 2000 tons. The Carnegie Steel Company continues booking small orders for standard sections in quantities ranging from 300 up to 1000 tons and is also booking good orders for standard sections and light rails for export. It received new orders and specifications in the past week of close to 2500 tons of light rails. The domestic demand for light rails is fair, but the traction lines are placing very little business. We quote light rails rolled from billets as follows: 25, 30, 35, 40 and 45 lb. sections, 1.10c.; 16 and 20 lb., 1.15c.; 12 and 14 lb., 1.20c., and 8 and 10 lb., 1.25c., in carload lots, f.o.b. Pittsburgh. For large lots these prices might be shaded.

Steel Wheels.—The Carnegie Steel Company has taken an order for 2400 cast steel wheels for new cars to be built for the Delaware, Lackawanna & Western railroad. We quote 33-in. engine truck wheels at \$21; 36-in. engine truck wheels, \$22; 33-in. tender wheels, \$17; 36-in. passenger and tender wheels, \$19 to \$19.50; 33-in. freight car wheels, \$14.50 to \$15, f.o.b. Pittsburgh.

Skelp.—Very little new business is being placed and demand for skelp from the pipe mills has been very dull for some time. Prices are without change and we quote; Grooved steel skelp at 1.15c. to 1.20c.; sheared steel skelp, 1.20c. to 1.25c.; grooved iron skelp, 1.50c. to

1.55c.; sheared iron skelp, 1.60c. to 1.65c., delivered to consumers' mills in the Pittsburgh district.

Wire Rods.—Consumers have pretty well covered their needs in wire rods over the balance of this year, most of these contracts having been placed on the basis of about \$24.50, f.o.b. Pittsburgh. Makers report that specifications against contracts are dull. We quote Bessemer, open-hearth and chain rods at \$24.50 to \$25, f.o.b. maker's mill, Pittsburgh, prices depending on desirability of the order.

Cotton Ties.—Reports are that foreign cotton ties, now in storage in this country, have been offered as low as 90c. per bundle of 45 lb. at Southern ports. The Carnegie Steel Company has about finished rolling its quota of cotton ties for the trade this season, but has not yet announced its price.

Iron and Steel Bars.—Several makers of steel bars state that some fairly large contracts from the implement makers have been taken for third and fourth quarter delivery this year, but the quantity placed is smaller than usual. One leading maker reports that it is holding steel bars firm at 1.15c. for third quarter and 1.20c. for fourth quarter. The new demand for reinforcing steel bars is good and promises to be heavy over the next several months. Iron bars are dull, but local makers state they are not shading 1.25c., though sold in other markets, notably Philadelphia and Chicago, at lower prices. We quote steel bars at 1.10c. for desirable orders and prompt shipment, and 1.12½c. to 1.15c. for third quarter delivery. We quote iron bars, made nearly entirely from muck bar, at 1.25c. f.o.b. maker's mill, Pittsburgh. Regular extras for twisting reinforcing steel bars over the base price are as follows: ¼-in. and over, \$1; ½ to 1 1/16-in., \$1.50; under ½-in., \$2.50 per net ton. These extras are not always observed.

Sheets.—Mills report that new demand is better than at any time for four or five months, and specifications are improving. One leading maker states that its actual new orders for black and galvanized sheets and specifications against contracts received last week were the heaviest in any one week for four or five months. Jobbers and consumers realize that prices are extremely low and are anxious to cover for third quarter and last half of the year, but the mills are refusing to sell so far ahead except at an advance. Some contracts for black sheets for third quarter delivery have been made at about 1.80c. and on galvanized at 2.75c. to 2.80c. This week the American Sheet & Tin Plate Company is operating to about 60 per cent. of its hot sheet mill capacity, this being a higher rate of operation than for several months. We quote Nos. 9 and 10 blue annealed sheets at 1.35c.; No. 28 Bessemer black, 1.80c. to 1.85c.; No. 28 galvanized, 2.75c. to 2.80c.; No. 28 black plate, tin mill sizes, H. R. and A., 1.85c.; Nos. 29 and 30, 1.90c. The above prices are in carload lots, f.o.b. Pittsburgh, jobbers charging the usual advances for small lots from store.

Tin Plate.—Specifications against contracts in the past month or six weeks have only been fair, but the leading mills have orders on hand for about all the tin plate they can turn out, running at full capacity over the next two or three months. The McKeesport Tin Plate Company, which now has 22 hot tin mills, will add 18 more, making a 40-mill plant. The leading tin plate mills are running practically full and shipments are heavy. New orders are light and only for small lots to cover current needs, as consumers are covered by contracts for their entire supply this year. We quote, 100-lb. 14 x 20 coke plates at \$3.30 to \$3.40, and 100-lb. 14 x 20 terne plates at \$3.20 to \$3.30, f.o.b. Pittsburgh.

Shafting.—New demand is quiet and only for small lots, and specifications are unsatisfactory. It is said the new demand for shafting for some time has not represented more than about 30 per cent. of capacity. We quote cold rolled shafting in carload and larger lots at 65 to 66 per cent. off, and in small lots at 63 to 64 per cent. off, delivered in base territory.

Spikes.—The dealers are not specifying very freely on contracts for spikes placed early in the year, and some of the makers are running to less than 50 per cent. of capacity. We quote standard sizes of railroad

spikes at \$1.40, and small railroad and boat spikes at \$1.50 per 100 lb. in carload and larger lots, f.o.b. Pittsburgh.

Merchant Steel.—Makers report a fair demand for seasonable steels in small lots, neither jobbers or consumers being inclined to stock up ahead. Specifications against contracts are only fairly active. Prices are more or less shaded, depending on the order and on small lots. We quote: Iron finished tire, ½ x 1½ in. and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to 1 in., 1.80c. to 1.90c.; 1½ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Wire Products.—This is the dull season in the wire trade and very few new orders are being placed and these only for small lots. Specifications against contracts have shown a marked falling off and the wire trade is operating at present on about a 50-per cent. basis. We quote wire nails, \$1.50 to \$1.55; plain annealed wire, \$1.30 to \$1.35; galvanized barb wire and fence staples, \$1.90 to \$1.95; painted barb wire, \$1.50 to \$1.55, all f.o.b. Pittsburgh, actual freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at \$1.55 to \$1.60 f.o.b. Pittsburgh.

Hoops and Bands.—New business is very light and only for small lots, not enough new orders coming out to test prices. Specifications against contracts are only fair. We quote steel bands at 1.10c. to 1.15c., with extras as per the steel bar card, and steel hoops at 1.25c., f.o.b. Pittsburgh. This price on steel hoops would be shaded if any orders of moment were being placed.

Nuts, Bolts and Rivets.—Some of the makers of nuts and bolts are not running to more than 35 to 40 per cent. and have very little work ahead. New demand is not any better and does not represent more than 25 to 30 per cent. of capacity. Structural rivets are in fair demand but boiler rivets are quiet. We quote buttonhead structural rivets in carloads at 1.55c. and in small lots 1.60c. to 1.65c.; conehead boiler rivets at 1.65c. in carload lots, and 1.70c. to 1.75c. in small lots, with terms 30 days net, less 2 per cent. for cash in 10 days. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws.....	80 and 5% off
Small carriage bolts, cut threads.....	80 and 5% off
Small carriage bolts, rolled threads.....	80 and 5% off
Large carriage bolts.....	75 and 5% off
Small machine bolts, cut threads.....	80 and 5% off
Small machine bolts, rolled threads.....	80 and 10% off
Large machine bolts.....	75 and 10% off
Machine bolts, c.p.c. & t nuts, small.....	80% off
Machine bolts, c.p.c. & t nuts, large.....	75 and 5% off
Square h.p. nuts, blanked and tapped.....	\$6.30 off list
Hexagon nuts.....	\$7.20 off list
C.p.c. and r sq. nuts, blanked and tapped.....	\$6.00 off list
Hexagon nuts, ¾ and larger.....	\$7.20 off list
Hexagon nuts, smaller than ¾ in.....	\$7.80 off list
C.P. plain square nuts.....	\$5.50 off list
C.P. plain hexagon nuts.....	\$5.90 off list
Semi-fin. hex. nuts, ½ in. and smaller.....	85, 10 & 10% off
Semi-fin. hex. nuts, ¾ in. and larger.....	85 & 5% off
Rivets, 7/16 x 6¼, smaller & shorter.....	80, 10 & 5% off
Rivets, tin plated, packages.....	80, 10 and 5% off
Rivets, metallic tinned, packages.....	80, 10 and 5% off
Standard cap screws.....	70, 10 and 10% off
Standard set-screws.....	75, 10 and 10% off

Boiler Tubes.—There is a fair demand for locomotive tubes, but merchant tubes are quiet. Discounts on both iron and steel tubes are more or less shaded, depending on the order. In fact the market on boiler tubes has been erratic for some months.

Standard Pipe.—Several large projects are under way but rights of way and financial matters will have to be arranged before orders develop. Demand for merchant pipe is showing betterment and two of the leading pipe mills report that orders booked in June will show an increase of 25 to 35 per cent. over May. The mills state that discounts on standard iron and steel pipe are being well maintained.

Coke.—Four or five inquiries for blast furnace coke for delivery over last half of the year are in the market, and some business has already been closed. A local maker of a high grade of blast furnace coke has taken contracts for 18,000 tons per month over all of this year at \$2 per net ton at ovens and has several other large similar contracts pending which it expects to close at the same price within a short time. It is said some blast furnace operators are now more inclined to pay a higher price for the very best makes of furnace coke, and while some makes can be had at \$1.85 for last half of the year, in two or three cases \$2 has been paid to secure the best grades. Another contract for furnace coke involving about 12,000 tons per month over last half is expected to be closed this week at \$1.85 or \$1.90 per net ton at ovens. We quote standard makes of furnace coke for prompt shipment at \$1.75, and on contracts for delivery over the last half of the year \$1.85 to \$2 per net ton at ovens, the latter price being for highest grade running low in sulphur. We quote standard makes of 72-hr. foundry coke at \$2.30 to \$2.50 per net ton at oven, according to quality. The output of coke in the upper and lower Connells-ville regions for the week ended June 13 was 259,615 tons, an increase over the previous week of 16,006 tons.

Old Material.—About the only material moving is borings and turnings, for which there is a good demand, and prices are ruling firm. There is a scarcity of the higher grades of steel scrap, due to the light operations of the steel mills. We note a sale of 300 tons of cast iron borings at \$8.25, delivered, and 500 tons of turnings at \$7.75, delivered; also a sale of 600 tons of selected heavy steel scrap at slightly less than \$12, delivered. Dealers quote, per gross ton, for delivery to consumers' mills in the Pittsburgh and nearby districts that take the same rates of freight as follows:

Selected heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	\$12.00
Ordinary steel melting scrap	\$11.50 to 11.75
Compressed side and end sheet scrap. No. 1 foundry cast	11.00 to 11.25
No. 2 foundry cast	11.50 to 11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	10.25 to 10.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	8.50 to 8.75
No. 1 railroad malleable stock	12.75 to 13.00
Railroad grate bars	11.00 to 11.25
Low phosphorus melting stock	10.25 to 10.50
Iron car axles	14.25 to 14.50
Steel car axles	22.50 to 23.00
Locomotive axles, steel	15.50 to 16.00
No. 1 busheling scrap	20.00 to 20.50
No. 2 busheling scrap	10.25 to 10.50
Machine shop turnings	7.25 to 7.50
Old carwheels	7.75 to 8.00
Cast-iron borings	11.25 to 11.50
†Sheet bar crop ends	8.25 to 8.50
Old iron rails	12.00 to 12.25
No. 1 railroad wrought scrap	13.75 to 14.00
Heavy steel axle turnings	11.50 to 11.75
Heavy breakable cast scrap	8.50 to 8.75
	12.00 to 12.25

†Shipping point.

Chicago

CHICAGO, ILL., June 24, 1914.—(By Wire.)

Buying of pig iron is diminishing again. Orders for steel are at about the same rate as a week ago. The mills appear to be bolstering up their current rolling schedules by tempting customers with attractive quotations to take at once material which is not likely to be used for some time. The mills are in some instances also making the acceptance of contracts conditional upon the release of some immediate shipment tonnage. The prospect for new business of any consequence is limited, the expectation of about 50,000 tons of car steel standing practically alone. The Illinois Central has increased its car order by 2000, the Wabash is ordering 60 locomotives and the Kansas City-Southern 40. The importance of the rate decision as a turning point appears to be greatly diminished and less is expected in the way of new equipment of orders than formerly. Market prices continue substantially as last reported, shapes, plates and bars going on the basis of 1.25c. to 1.28c., Chicago, and No. 28 sheets at 1.75c. and 2.75c. The basis for third quarter contracts is now

pretty well established on the same level as prompt shipment orders, but bookings for the last half are accepted less readily by the mills and prices are more generally equivalent to 1.15c., Pittsburgh. A few small implement bar contracts have been taken on the basis of 1.15c. for the last half and 1.20c. for the first half of 1915, but the business which makes the market is still unplaced.

Pig Iron.—Inquiries are still coming in from many directions, but the number is perceptibly less and the volume smaller. The fact that there is nothing especially attractive under consideration is limiting the market to a narrow range of prices at the higher levels corresponding to smaller tonnage. We have revised our quotations accordingly. The interesting competition is between the local high phosphorus and the Southern irons. The former is selling approximately on the basis of \$10, Birmingham, while the Southern market appears to be holding at \$10.25. Melters are showing no great eagerness to purchase but do close in the end, realizing the obvious fact that prices are at a very safe level. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	\$15.75 to \$16.75
Northern coke foundry, No. 1	14.50 to 15.00
Northern coke foundry, No. 2	13.75 to 14.25
Northern coke foundry, No. 3	13.50 to 14.00
Southern coke, No. 1 f'dry and 1 soft	15.10 to 15.35
Southern coke, No. 2 f'dry and 2 soft	14.60 to 14.85
Malleable Bessemer	14.00 to 14.25
Standard Bessemer	17.00
Basic	13.25 to 13.50
Low phosphorus	21.00 to 21.75
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. silv'y, 10 per cent.	18.90 to 19.40

(By Mail)

Rails and Track Supplies.—Details of the Chicago, Milwaukee & St. Paul rail purchase now available indicate the placing of 5000 tons each with the Lackawanna and Cambria Steel Companies and 2000 tons each with Bethlehem and Pennsylvania. The balance of a total purchase of 30,000 tons went to the Illinois Steel Company. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, \$25.50 to \$26 f.o.b. mill net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—The only source of any considerable tonnage of plain material now in sight is the car business recently closed. Illinois Central has increased its order from 3000 to 5000 cars and for these cars as well as those for the New York Central lines to be built in the West, the steel has not yet been purchased. It will aggregate approximately 50,000 tons. The municipal pier, Chicago, involving about 7000 tons, is expected to come up this week again. Other specifications are largely for the miscellaneous small jobs usually in the market. The most important order for fabricated material taken last week is that for 1220 tons for a Chicago & Northwestern bridge over the Chicago River, awarded to the American Bridge Company, which will also furnish 266 tons of girder spans for the Inter-Mountain at Boise, Idaho. The Milwaukee Structural Steel Company will furnish 215 tons for the Ashland, Wis., court house. The Great Falls, Mont., Power Company has placed the order for 546 tons for a power house. Fabricators are passing through a period of low prices which parallel mill quotations for extreme values. Plain shapes for Chicago delivery from mill continue to be commonly quoted at 1.28c.

Of orders for structural material in lots of a few pieces local jobbers report a very fair volume. In the light of the buying tactics generally prevalent the fact that this demand is fairly well sustained is not surprising. We quote for Chicago delivery from store 1.75c.

Plates.—Plate mills continue to suffer from a dearth of orders and delivered prices at Chicago for plates are suffering in consequence. So low a level has been reached, however, that no very marked concessions can be expected to distinguish between small orders and

the very largest. We quote for Chicago delivery from mill, 1.25c. to 1.28c.

For Chicago delivery of plates from store we quote 1.75c.

Sheets.—The sharp line between immediate shipment orders and future delivery contracts continues to be drawn. Even for the limited period through which the mills are willing to contract, they are declining to accept contracts where the buyer is unwilling to place some business for immediate shipment. Partial explanation for increased specifications and orders in the past few weeks is that many consumers are anticipating requirements and taking material at once for future consumption because of the attractive prices obtained. In this they are being encouraged by the mills. Contracts for third quarter are being taken in some instances, and the prices are as low as prevailed for spot shipments in the last low period. Reports of quotations as low as 2.70c. for galvanized are not uncommon, but the average buyer finds 2.75c. the price he is more likely to secure. We continue to quote for Chicago delivery from mill: No. 10 blue annealed, 1.48c.; No. 28 black, 1.93c. to 1.98c.; No. 28 galvanized, 2.88c. to 2.93c.

We quote for Chicago delivery from store as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.35c. to 2.45c.; No. 28 galvanized, 3.35c. to 3.45c.

Bars.—Some of the smaller implement bar contracts have been placed, but thus far no mill appears to have committed itself for the full year at one price. Some contracts have been taken at 1.15c. for the last half and 1.20c. for the first half of next year. None of the larger contracts has been closed, from which it may be assumed that the future does not as yet appear definitely outlined to either makers or consumers. Current orders are being taken at 1.28c., Chicago, which price also applies to reinforcing bars. In general the demand for bars for this purpose is tapering off, but we note the awarding of contracts for the reinforced concrete construction of a highway bridge at Yuba County, Cal.; a viaduct at Canon City, Col., and the Three Arts Club building, Chicago, plans for which call for an aggregate of 975 tons in structural steel. We quote for mill shipments as follows: Bar iron, 1.05c. to 1.10c.; soft steel bars, 1.28c.; hard steel bars, 1.25c. to 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—An occasional carload order is the extent of rivet bookings by local makers. Prices have slumped for Western delivery to the basis of 1.68c., Chicago, but new business appears to be waiting, not so much on the matter of price as a general increase in consumption. We quote from mill as follows: Carriage bolts up to $\frac{3}{4}$ x 6 in., rolled thread, 80-5; cut thread, 80; larger sizes, 75-5; machine bolts up to $\frac{3}{4}$ x 4 in., rolled thread, 80-10; cut thread, 80-5; larger sizes, 75-10; coach screws, 80-15; hot pressed nuts, square head, \$6.20 off per cwt.; hexagon, \$7 off per cwt. Structural rivets, $\frac{1}{2}$ to $\frac{3}{4}$ in., 1.68c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.35c.; boiler rivets, 2.55c.; machine bolts up to $\frac{3}{4}$ x 4 in., 75-10; larger sizes, 70-10-5; carriage bolts up to $\frac{3}{4}$ x 6 in., 75-5; larger sizes, 70-10 off; hot pressed nuts, square head, \$6, and hexagon, \$6.70 off per cwt.

Hoops and Bands.—New orders are too scarce to offer any encouragement to the seeker after more business. Specifications are also coming in all too slowly. We quote for Chicago delivery of bands 1.33c., and for hoops 1.43c.

Cast-Iron Pipe.—At Highland Park, Mich., final decision has been made to use 1700 tons of cast-iron pipe and the award was made to the U. S. Cast Iron Pipe & Foundry Company, which also took 350 tons at Nickerson, Kan. At Holland, Mich., 150 tons was awarded to Jas. B. Clow & Sons. The work at Salt Lake City is still open. We quote as follows, per net ton, Chicago:

Water pipe, 4 in., \$26; 6 to 12 in., \$24; 16 in. and up, \$23.50, with \$1 extra for gas pipe.

Wire Products.—The wire trade has settled down to the lethargy of the midsummer season. In none of the several lines of product is there any particular activity. Customers are no more than casually interested, even in prices. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.53; wire nails, \$1.68 to \$1.73; painted barb wire, \$1.68 to \$1.73; galvanized, \$2.13 to \$2.18; polished staples, \$1.68 to \$1.73; galvanized, \$2.03 to \$2.08, all Chicago.

Old Material.—The temptation to buy scrap the past few weeks because of the low prices now finds many dealers long on material ready for delivery, but with no orders for spot shipment. Prices are still attractive to those who want delivery in the future, and it is not difficult to sell to them, but for cars on track there are few takers. Quotations show practically no changes in value. Railroad scrap lists offer for sale 2200 tons from the Grand Trunk, including 1000 car wheels; 2000 tons from the St. Paul, including 500 tons of wheels; 2000 tons from the Burlington and 2750 tons from the Rock Island. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$12.75 to \$13.25
Old steel rails, rerolling	11.50 to 11.75
Old steel rails, less than 3 ft.	10.50 to 11.00
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	11.50 to 11.75
Heavy melting steel scrap	9.75 to 10.00
Frogs, switches and guards, cut apart	9.75 to 10.00
Shoveling steel	9.25 to 9.50
Steel axle turnings	6.75 to 7.25

Per Net Ton	
Iron angles and splice bars	\$12.00 to \$12.50
Iron arch bars and transoms	12.00 to 12.50
Steel angle bars	9.00 to 9.50
Iron car axles	16.50 to 17.00
Steel car axles	12.25 to 12.50
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.75 to 9.00
Cut forge	8.50 to 8.75
Steel knuckles and couplers	9.00 to 9.50
Steel springs	9.25 to 9.75
Locomotive tires, smooth	9.75 to 10.00
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.00
No. 1 busheling	7.50 to 7.75
No. 2 busheling	6.00 to 6.25
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	9.75 to 10.25
Stove plate and light cast scrap	8.75 to 9.00
Grate bars	8.50 to 8.75
Railroad malleable	9.00 to 9.25
Agricultural malleable	8.00 to 8.50
Pipes and flues	6.50 to 7.00

Philadelphia

PHILADELPHIA, PA., June 23, 1914.

A betterment in activity in this market is unquestioned, though it has not reached all lines of the iron and steel trade. The increased number of sales and inquiries in pig iron is regarded as healthy, despite the low prices and the fact that foundry grades are showing more life than steel-making iron. In keeping with the season, contracts are being entered for coke, both furnace and foundry, particularly the latter. In several products there would be still greater buying if sellers would accept present prices for last half deliveries. This is especially true with regard to sheets and billets. Bars, plates and shapes show little or no actual change, although there are some encouraging indications and sentiment is correspondingly improved. The steel rail business is a little more active and more promising. Mills show but little or no interest in old material, but prices in general hold steady.

Iron Ore.—Such partial awakening of new demand as there has been in some directions has not been felt in this branch of the trade. Imports in the week ending June 20 were 5250 tons from Cuba and 6415 tons from Newfoundland.

Pig Iron.—That business is better is undisputed, all reports indicating that sales are more numerous and more generous in quantities taken, but there is still some distance to go to reach normal activity. The

movement is mainly in foundry iron, basic being extremely quiet, although low phosphorus has been selling rather well. The buying of foundry iron has been due partly to necessity, in view of the nearness of the third quarter and partly to a desire to pick up bargains, and of the latter business there would be much more if shrewd buyers could get sellers to accept the prices offered. New England consumers, especially, have shown a readiness to buy at their own price. As it is, most of the buying has been around the low level of the price range, many sales having been made at \$14.75 to \$14.80 for eastern Pennsylvania No. 2 X. The Norfolk & Western Railroad has closed against its requirement of about 2000 tons of various grades. Virginia iron shows improvement, the sales having been made at the full prices of \$12.75 at furnace for No. 2 X and \$12.50 for No. 2, prices which are subject to freight rates of \$2.80 and \$3 for delivery here. One seller of Virginia iron sold 1300 tons in the week and about 2700 tons in the month, which is accounted good in view of the recent sluggish state of trade. Even with the better demand there is some tendency, especially on the part of light hardware manufacturers, to hold off on taking deliveries. A hardware maker at Reading, Pa., is out with an inquiry for about 600 tons of No. 2, running 2.50 to 3 per cent. silicon, and a company at Salem, N. J., which was in the market for between 1000 and 1500 tons, has bought, it is understood. A company at Trenton, N. J., took about 500 tons of Nos. 2 and 3 for early shipment. There have been other sales of this caliber, but more where only 100 to 200 tons were involved. It is interesting to note that when the economy of buying now is pointed out to some consumers they reply that they would be willing to pay more than prevailing prices providing their need for iron would improve. In Lebanon low phosphorus there has been some good trading at \$17.50 at furnace, one third-quarter contract being for 2400 tons. Standard low phosphorus in lots aggregating several hundred tons have been taken also, at prices ranging between \$21 and \$21.50, Philadelphia, according to delivery and specification. The following range of prices represents the general market for standard brands, delivered in buyers' yards in this territory:

Eastern Penna. No. 2 X foundry	....\$14.75 to \$15.00
Eastern Penna. No. 2 plain	..... 14.50 to 14.75
Virginia No. 2 X foundry	..... 15.55 to 15.75
Virginia No. 2 plain	..... 15.30 to 15.55
Gray forge	..... 13.75 to 14.00
Basic	..... 14.00
Standard low phosphorus	..... 20.50 to 21.00

Ferroalloys.—In this territory no sales are reported, though a little may have been sold inland by local agents. The quotation for both English and German 80 per cent. ferromanganese remains at \$38, seaboard. Importations of the week were 409 tons from England and 25 tons from Germany. Ferrosilicon is unchanged at \$71 to \$73, Pittsburgh, for 50 per cent., depending on quantity taken.

Bars.—With the trade showing but little improvement, quotations for iron bars remain at 1.17½c. to 1.22½c., delivered—in some instances higher—according to quality. For steel bars, makers are quoting 1.30c., Philadelphia, though they are asked to meet 1.25c., and they explain that this price would be considered only in case of a desirable lot for prompt delivery. As a rule, inquiry is quiet, though the agricultural implement trade is beginning to talk about needs of next season. No unusual call for concrete bars is noted.

Structural Material.—The general contract for the new municipal building at Wilmington has been awarded to the Belmont Iron Works. Reports of the steel which it will require have varied considerably, but 1400 tons is now stated as about correct. The Guernsey-O'Mara Company, Philadelphia, has the general contract for the Pennsylvania Sugar Refining Company, this city, but the steel contract is still pending. Mill operations continue at not much over 50 per cent. of capacity, mainly because small orders which are good fillers in are comparatively few. Prices range from 1.25c. to 1.30c., Philadelphia. Small quantities bring 1.30c.

Plates.—A tendency on the part of close buyers to offer business provided they get concessions, with sellers

refusing to reduce their prices, is regarded as one good indication, while another is a willingness on the part of some consumers to contract for the entire second half. Here again, makers decline to enter contracts for the reason that present prices are not pleasing. Business, meanwhile, consists very largely of miscellaneous small orders, for which 1.30c., Philadelphia, is asked. In some instances 1.25c., Philadelphia, is done for good-sized lots.

Billets.—Makers are operating against specifications good to July 1, and the outlook beyond that date continues unsatisfactory. They adhere to \$22.40, Philadelphia, for basic open-hearth rolling billets, with forging steel \$4 to \$5 a ton over this figure. At present quotations long contracts are not looked on with favor.

Sheets.—Inquiry is better, though much of it has not culminated in business. Local producers have refused to take on any business for the last quarter at existing prices. The operation of mills has been cut down and they are running at about 50 per cent. of capacity. Quotations for No. 10 blue annealed sheets are unchanged at 1.50c., Philadelphia.

Coke.—Contracts in good number are being made, especially for foundry coke, though furnace is by no means neglected. Quotations vary considerably, but standard grades of foundry are quoted mostly between \$2.50 to \$2.75 per net ton at oven, though a seller has offered down to \$2.40. Last half furnace coke is about \$2 at oven, with prompt at around \$1.85 at oven. The Norfolk & Western Railroad has closed for between 500 and 800 tons of Pocohontas foundry, an Eastern steel mill has taken a good block of furnace and another buyer has contracted for 12,000 tons of furnace for last half. Freight rates to this city from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

Old Material.—Sales have improved but little, if at all, but there is an undercurrent of better feeling. Heavy melting scrap is quoted at \$10.50 to \$11, but higher than \$10.75 could not be easily obtained. Quotations are unchanged, except in two or three instances, the following representing the market for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel	.....\$10.50 to \$11.00
Old steel rails, rerolling	..... 12.00 to 12.50
Low phosphorus heavy melting steel	..... 14.00 to 14.50
scrap	..... 14.00 to 14.50
Old steel axles	..... 20.00 to 21.00
Old iron axles (nominal)	..... 15.00 to 15.50
Old iron rails	..... 11.00 to 11.50
Old carwheels	..... 12.50 to 13.00
No. 1 railroad wrought	..... 9.25 to 9.75
Wrought-iron pipe	..... 8.00 to 8.50
No. 1 forge fire	..... 8.00 to 8.50
Bundled sheets	..... 5.00 to 5.50
No. 2 light iron	..... 8.00 to 8.50
No. 2 busheling	..... 7.75 to 8.25
Wrought turnings	..... 8.00 to 8.50
Cast borings	..... 12.00 to 12.50
No. 1 cast	..... 8.00 to 8.50
Grate bars, railroad	..... 8.50 to 9.00
Stove plate	..... 9.00 to 9.50
Railroad malleable	..... 9.00 to 9.50

The Gee & Ludwig Company, Harrison Building, Philadelphia, has been appointed district representative for the Interstate Iron & Steel Company, whose product consists of bars, small angles, channels, etc., used largely by bedstead and agricultural implement manufacturers. This company makes a specialty of the Reliance bar for reinforcing concrete.

Boston

BOSTON, MASS., June 23, 1913.

Old Material.—Actual transactions show little improvement and prices have not advanced, with the exception that cast borings are 25c. higher. However, the general feeling is better, and in this New England usually reflects the great producing centers. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with

Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	\$8.25 to	\$8.50
Low phosphorus steel	13.75 to	14.75
Old steel axles	13.25 to	13.75
Old iron axles	21.25 to	21.75
Mixed shafting	12.00 to	12.25
No. 1 wrought and soft steel	9.00 to	9.25
Skeleton (bundled)	5.50 to	5.75
Wrought-iron pipe	7.50 to	7.75
Cotton ties (bundled)	6.00 to	6.25
No. 2 light	3.75 to	4.25
Wrought turnings	5.00 to	5.50
Cast borings	5.25 to	5.75
Machinery, cast	11.25 to	11.50
Malleable	8.00 to	8.25
Stove plate	7.75 to	8.00
Grate bars	5.25 to	5.50
Cast-iron carwheels	11.00 to	11.25

Cleveland

CLEVELAND, OHIO, June 23, 1914.

Iron Ore.—A number of Lake Superior mines have been temporarily shut down during the past two weeks, and unless the demand for ore improves others will be added to the idle list. Most ore firms are curtailing their production and it is probable that unless conditions improve materially the operation of some of the mines that are being closed will not be resumed during the season. There is a general disposition not to accumulate stock piles of ore that cannot be sold. There is practically no buying and lake shipments show very little if any improvement. We quote prices as follows: Old range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; old range non-Bessemer, \$3; Mesaba non-Bessemer, \$2.85.

Pig Iron.—Practically no inquiries or sales are evident in the northern Ohio territory, but one lake furnace reports a better outlook, having received inquiries aggregating about 8000 tons in the past day or two. The same interest reports the sale of a 2000 ton lot of low grade foundry iron. In the absence of inquiries local furnaces continue to quote No. 2 foundry at \$14.25, delivered Cleveland, but this is admitted to be nominal. Some foundries have enough iron to last them through the third quarter, and as others will need no additional iron before August or later the prospects are not bright for an early buying movement in this territory. Shipments are being held up and the stocks in some furnace yards are growing rapidly. Unless there is a decided change for the better some merchant stacks will probably be blown out. Southern iron is quiet, the only sale reported being a 500-ton lot in central Ohio at \$10.25 for No. 2 for the last half. The inquiry of the leading sanitary interest for Northern and Southern iron is still pending. We quote for Cleveland delivery as follows:

Bessemer	\$14.90
Basic	\$13.75 to 13.90
Northern No. 2 foundry	14.25
Southern No. 2 foundry	14.60
Gray forge	13.50
Jackson Co. silvery, 8 per cent. silicon	17.55
Standard low phosphorus, Valley furnace	20.25

Coke.—A fair volume of business is being placed in foundry coke contracts for 12 months from July 1. When the buying movement started some contracts were placed at \$2.65, but makers of the best known brands have reduced their price to \$2.50, which is the prevailing price for contracts asked by makers of high grade coke. Some brands can be had at \$2.35. The leading sanitary interest is inquiring for 20,000 tons, covering its requirements in Louisville for a year. Some consumers are holding off, hoping to get lower prices. Furnace coke is quiet. We quote standard Connellsville furnace coke at \$1.75 per net ton at oven for spot shipment and \$1.85 to \$2 for contract.

Finished Iron and Steel.—The market is very quiet in practically all lines. Some additional steel bar contracts with the implement trade have been placed at 1.15c. for the last half and others at 1.15c. for the third quarter to 1.20c. for the fourth quarter, the buyers being allowed to specify at 1.10c. while that is the current price. However, contracts are being offered to the implement trade as low as 1.10c. for the third quarter. Some buyers are holding off because of the refusal of the mills to make contracts for delivery beyond Jan-

uary 1. Plates and structural material are in light demand with 1.10c. as the general quotation for desirable orders. Some boiler plate contracts have been closed at 1.15c. for the third quarter and 1.20c. for the fourth quarter. The contract for new buildings for the plant of the Federal Foundry Company, Indianapolis, has been awarded by a Cleveland engineer to the McClintic-Marshall Construction Company. This work will require 700 tons of steel. Bar iron continues dull and weak, with quotations at 1.15c. to 1.20c., Cleveland. The demand for sheets is not active. For the third quarter some contracts are being placed at 1.80c. for No. 28 black, 2.80c. for No. 28 galvanized and 1.35c. for No. 10 blue annealed, these prices apparently representing the bottom of the market. Warehouse business is very light with prices unchanged at 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—Some rivet contracts for the last half are being made at the current prices of 1.50c. for structural and 1.60c. for boiler for car lots, these being minimum quotations. The demand for bolts and nuts is light and prices are weak. The demand is only about 25 per cent. of capacity. We quote discounts as follows: Common carriage bolts, $\frac{3}{4}$ x 6 in., smaller or shorter, rolled thread, 80 and 5 per cent.; cut thread, 80 per cent.; larger or longer, 75 and 5 per cent.; machine bolts with h.p. nuts, $\frac{3}{4}$ x 4 in., smaller or shorter, rolled thread, 80 and 10 per cent.; cut thread, 80 and 5 per cent.; larger or longer, 75 and 10 per cent.; coach and lag screws, 80 and 15 per cent.; square h.p. nuts, blank or tapped, \$6.30 off; hexagon h.p. nuts, blank or tapped, \$7.20 off; c. p. c. and t. square nuts, blank or tapped, \$6 off; hexagon, $\frac{1}{2}$ in. and larger, \$7.20 off; 9/16 in. and smaller, \$7.80 off; semi-finished hexagon nuts, $\frac{1}{2}$ in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—The market continues inactive, but there is a somewhat better feeling and dealers look for an improvement early in July. Consumers continue to take scrap on contracts very slowly and a leading Youngstown consumer has shut off on shipments. A Cleveland mill is in the market for heavy melting steel at \$10.50. There has been some activity in turnings for shipment to Youngstown. In spite of the dullness the available supply is not large, owing to the falling off in the production. Yard dealers generally are holding their scrap for better prices. We quote f.o.b. Cleveland as follows:

Per Gross Ton	
Old steel rails, rerolling	\$11.50 to \$12.00
Old iron rails	13.00 to 13.50
Steel car axles	15.00 to 15.25
Heavy melting steel	10.25 to 10.75
Old carwheels	11.25 to 11.50
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	10.25 to 10.75
Light bundled sheet scrap	7.50 to 8.00

Per Net Ton	
Iron car axles	\$18.00 to \$19.00
Cast borings	5.50 to 6.00
Iron and steel turnings and drillings	5.25 to 5.75
Steel axle turnings	6.75 to 7.25
No. 1 busheling, new	8.50 to 8.75
No. 1 busheling, old	8.00 to 8.25
No. 1 railroad wrought	9.50 to 10.00
No. 1 cast	10.50 to 10.75
Stove plate	7.50 to 8.00

Buffalo

BUFFALO, N. Y., June 23, 1914.

Pig Iron.—Inquiry has been less active and the aggregate of sales for the past week somewhat smaller than for the previous one, totaling about 5000 tons, foundry grades. It is stated that some Eastern consumers have been quoted \$12.75, Buffalo, for No. 2 X foundry, but apparently \$13 is now the minimum for Buffalo furnaces. The higher silicon differentials are still being waived in some instances. Reports from the foundry trade in this district show that business continues at a very low ebb. The bright spot in the local market is the securing by the New York Car Wheel Company of this city of the contract for one-half of the 74,000 tons of segment castings, for the new East River tunnels, New York City. The pig-iron requirements for this 37,000-ton contract are under negotiation

but have not yet been placed. It is not decided whether the order will go to one furnace or be divided. Prices are the same as reported last week which nominally are as follows, f.o.b. furnace for current and third quarter delivery:

No. 1 foundry	\$13.50 to \$14.00
No. 2 X foundry	13.00 to 13.50
No. 2 plain	13.00 to 13.25
No. 3 foundry	13.00
Gray forge	13.00
Malleable	13.00 to 13.50
Basic	13.50 to 13.75
Charcoal, regular brands and analysis	15.75 to 16.75
Charcoal, special brands and analysis	20.50

Finished Iron and Steel.—Some improvement in feeling is apparent, although new business has not been large. Neither buyers nor sellers are displaying much interest in contracts for future delivery. This applies to bars, shapes and plates. Most producers and agencies are asking 1.15c., Pittsburgh, for third quarter and 1.20c. for fourth. Spot shipment business for immediate specification is ruling at 1.10c. to 1.15c., Pittsburgh, according to the desirability of the order from a rolling standpoint. Specifications for the month of June are exceeding those for the corresponding period in May and an improvement over any month since February. The demand for tin plates is good, can makers specifying their full contract tonnage, weather conditions pointing to a large fruit and vegetable yield. A fair volume of business is reported in fabricated structural materials with a cheerful tone to the market. The contract for 200 tons of steel for the King Sewing Machine plant, Buffalo, was placed with the Riverside Bridge Company, Wheeling, W. Va.; 120 tons for the Church of the Assumption, Buffalo, with the Pittsburgh Bridge & Iron Company; 100 tons for the Satler theatre with the Gedrgge Kellogg Structural Company, Buffalo, and a like amount for an annealing building for Pratt & Letchworth Company with the Buffalo Structural Company. Lupfer & Renwick, Buffalo, have the general contract for the highway lift bridge for Westchester County at Mt. Vernon, N. Y., taking 125 tons of steel.

Old Material.—Sales for the week have been light, most of this being in heavy melting steel. Some transactions in old iron axles to outside markets are reported. We quote dealers selling prices as follows per gross ton f.o.b. Buffalo:

Heavy melting steel	\$10.25 to \$10.50
Low phosphorus steel	14.50 to 15.00
Boiler plate sheared	11.50 to 12.00
No. 1 railroad wrought scrap	10.50 to 11.00
No. 1 railroad and machinery cast	10.50 to 11.00
Old steel axles	12.75 to 13.25
Old iron axles	19.50 to 20.50
Old carwheels	10.50 to 11.00
Railroad malleable	9.75 to 10.00
Machine shop turnings	5.25 to 5.75
Heavy axle turnings	7.50 to 8.25
Clean cast borings	6.00 to 6.50
Old iron rails	13.75 to 14.00
Locomotive grate bars	8.50 to 9.00
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	7.50 to 8.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheling scrap	8.25 to 8.75
No. 2 busheling scrap	5.75 to 6.25
Bundled tin scrap	10.50

Cincinnati

CINCINNATI, OHIO, June 24, 1914.—(By Wire.)

Pig Iron.—The inquiry and volume of business transacted shows considerable improvement. The past week brought out many customers for foundry iron who have been holding back, but the major part of actual business transacted has been under cover. The principal interesting feature of this market is the minimum price at which both Northern and Southern iron can be obtained for third quarter shipment. It is now known that a lot of foundry iron put on the market some three weeks ago by a furnace in the Hanging Rock district was not taken entirely by consumers. A small part of this iron is still being sold around \$13 to \$13.25 per gross ton, Iron-ton. Furnace operators are holding firm at \$13.50, but there is another small lot of resale iron bought at a lower figure that has now been put on the market in a quiet way below quoted prices. Southern No. 2 foundry can be bought at \$10.25, Bir-

mingham basis, for delivery through the remainder of the year, although the majority of furnaces are asking \$10.50 to \$11. Approximately 600 tons were sold at \$10.25 to an Ohio smelter for July-December shipment. About 900 tons was taken by a central Ohio consumer at the same figure. There were also numerous other smaller sales made and it appears that the market prices quoted below are firmly established for either prompt or future shipments. It is rumored that a large sanitary manufacturing concern will purchase soon 7000 tons of Southern iron for one of its Kentucky plants for the remainder of the year. A central Ohio firm is expected to book 1000 tons of Northern No. 2 foundry and a northern Ohio manufacturer will close this week for the same tonnage, all for last half delivery. In spite of the low prices prevailing there is a distinctively better feeling among both buyers and sellers. Basic is not in large demand, but 2000 tons was taken by a central Ohio manufacturer for shipment this year from an Iron-ton furnace. A few consumers of both foundry and basic iron have been trying to feel out the market for the first quarter of 1915, but have met with no encouragement from the furnace interests. Malleable iron continues dull. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	\$14.00 to \$14.50
Southern coke, No. 2 f'dry and 2 soft	13.50 to 14.00
Southern coke, No. 3 foundry	13.00 to 13.50
Southern No. 4 foundry	12.50 to 13.00
Southern gray forge	12.00 to 12.50
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.70 to 16.20
Southern Ohio coke, No. 2	14.70 to 15.20
Southern Ohio coke, No. 3	14.45 to 14.70
Southern Ohio malleable Bessemer	14.70 to 15.20
Basic, Northern	14.70 to 15.20
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

Coke.—Contracting for foundry coke continues, but on a comparatively small scale. At this time of the year practically all the foundries in this section are usually out of the market, having contracted for future requirements earlier in the season, those now needing coke arranging for only a short supply ahead. Another cause for holding back is that quite a number have not been able to consume coke previously bought, and instead of taking on a new supply, are trying to take care of shipments now overdue. A few cases are on record from customers who have requested cancellations on portions of their old contracts. However, as some improvement in the melt is apparent, though small, it is somewhat encouraging. Furnace coke is also dull, but there has been some contracting for small lots, going to other territory. Prices are stationary, with prompt Connellsville 48-hr. brands quoted around \$1.75 to \$1.90 per net ton at oven, the first named figure representing prompt shipment business. Foundry coke is now the same in all three districts, with \$2.25 representing the prompt quotation and around \$2.50 for contract business. A few Wise county and Pocahontas producers are asking almost as much for furnace coke as for the 72-hr. product.

Finished Material.—A number of independent sheet mills anticipate closing down during the month of July for repairs, as well as to await an adjustment of the wage schedule, now under discussion. This has tended to strengthen the market to some extent, but on desirable business for prompt shipment, as low as 1.90c., Cincinnati, or Newport, Ky., can be done. The regular market price on small tonnages is around 1.95c., however, and no long time contracts are solicited. Galvanized sheets are from 2.90c. to 2.95c. Steel bars and small structural shapes are quoted by mill agencies around 1.12½c., Pittsburgh, but as low as 1.10c. can be done. Carload prices on plates range from 1.10c. to 1.15c. a lb., Pittsburgh. Warehouse prices on steel bars are from 1.75c. to 1.80c. and on steel bars from 1.85c. to 1.90c. These quotations are good on less than carload quantities from stock. Railroad track material is slow. Hoops and bands also show no improvement.

Old Material.—Prices are very uncertain. The rolling mills are buying very little scrap material, and at the present time there is an embargo against shipments

to the American Rolling Mill Company, Middletown, Ohio. It is the reported intention of several independent rolling mills to shut down during the month of July, although this information has not yet been definitely given out. This will further reduce the demand for old material, and with the present softness of pig-iron quotations, it is more than probable that scrap prices will sag below the present level. As a matter of fact the quotations we give this week are only nominal. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio, and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton		
Bundled sheet scrap	.....	\$6.75 to \$7.25
Old iron rails	.....	11.75 to 12.25
Relaying rails, 50 lb. and up	.....	19.75 to 20.25
Re-rolling steel rails	.....	10.75 to 11.25
Melting steel rails	.....	9.25 to 9.75
Old carwheels	.....	10.25 to 10.75

Per Net Ton		
No. 1 railroad wrought	.....	\$8.75 to \$9.25
Cast borings	.....	4.50 to 5.00
Steel turnings	.....	4.50 to 5.25
Railroad cast scrap	.....	9.25 to 9.75
No. 1 machinery cast scrap	.....	10.25 to 11.25
Burnt scrap	.....	6.00 to 6.75
Old iron axles	.....	16.75 to 17.25
Locomotive tires (smooth inside)	.....	9.75 to 10.25
Pipes and flues	.....	6.25 to 6.75
Malleable and steel scrap	.....	7.25 to 7.75
Railroad tank and sheet scrap	.....	5.25 to 5.75

Birmingham

BIRMINGHAM, ALA., June 22, 1914.

Pig Iron.—Manufacturers of pig iron and some brokers report greater briskness and generality of inquiry than has been the case since the opening of the year. Sales continue on a sizeable tonnage basis. One company has sold 45,000 tons this month, much of it last week, reporting a number of sales in Cincinnati and Chicago territory and liberal takings around St. Louis. All are agreed as to price. The basis continues to be \$10.25 for spot and third quarter and \$10.50 for fourth quarter. The inquiry has given a stimulus to prospective production. The Woodward Iron Company proposes to blow in an additional stack within a week and another some time during July. Brokers have been among the buyers and they admit that \$10.25 is the best doing for as much as 2000-ton lots. One brokerage firm closed deals for 7000 tons in the past week. It is probable that sales in the Birmingham district since the buying movement started in the last week of May have totaled as high as 230,000 tons. Some makers are inclined to look for a stiffening of price by at least 25c. in the near future. With few exceptions, they are more sanguine than they have been in some time. Particularly pleasing has been the re-opening of business in the Middle West, whose buyers are still on the list of active inquirers. We quote, per gross ton, f.o.b. Birmingham furnaces, for third and fourth quarter as follows:

No. 1 foundry and soft	.....	\$10.75 to \$11.00
No. 2 foundry and soft	.....	10.25 to 10.50
No. 3 foundry	.....	9.75 to 10.00
No. 4 foundry	.....	9.50 to 9.75
Gray forge	.....	9.25 to 9.50
Basic	.....	10.00 to 10.25
Charcoal	.....	23.50 to 24.00

Cast-Iron Pipe.—Pipe makers report an increase in inquiry from a wide territory, extending into the Far West and Southwest as well as for export. Actual transactions have been of sufficient volume, coupled with the inquiries, as to impart a really cheerful tone to the water-pipe and gas-pipe market. Stocks of sanitary pipe are low and a fairly good business is being done and predicted for the near future. We quote, per net ton f.o.b. pipe shop yards, as follows: 4-in., \$20.50; 6-in. and upward, \$18.50, with \$1 added for gas pipe.

Coal and Coke.—There has been a gradual increase in coal mine activity, but prices are still low. The prospect for a large output from midsummer on is growing bright. The operators are pleased with the action of the Alabama railroads in coming to an agreement with them to readjust rates on coal from Alabama mines. This will be done at a conference soon

to be held. An inquiry for coke from Honolulu is said to be promising if proper shipping and bagging arrangements can be made. Not a great deal of coke is offering, owing to the decrease in the output. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, \$2.75 to \$2.90; foundry, \$3 to \$3.30.

Old Material.—The scrap market is featureless, but dealers are inclined to look for better business after midsummer. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	.....	\$14.50 to \$15.00
Old steel axles	.....	14.50 to 15.00
Old iron rails	.....	13.00 to 13.50
No. 1 railroad wrought	.....	10.00 to 11.00
No. 2 railroad wrought	.....	8.50 to 9.00
No. 1 country wrought	.....	9.00 to 10.00
No. 2 country wrought	.....	8.00 to 9.00
No. 1 machinery cast	.....	9.50 to 10.00
No. 1 steel scrap	.....	8.00 to 8.50
Tram carwheels	.....	9.50 to 10.00
Standard carwheels	.....	10.50 to 11.00
Stove plate	.....	8.00 to 8.50

St. Louis

ST. LOUIS, MO., June 22, 1914.

Pig Iron.—The week just closed has been marked by considerable buying of pig iron in small lots of 50 to 300 tons for early delivery, immediate need being apparent in most of the business which was closed. They were mostly for No. 2 Southern, with a little Northern included. The large sales of the week were one of 1000 tons of No. 2 Southern for St. Louis territory, which is generally known to have been closed on a basis of \$10, Birmingham, with a strict agreement that it shall all be taken before the end of the third quarter, the furnace accepting the order being unwilling to consider the price named into the fourth quarter; one of 1500 tons of Northern and one of 1500 tons of Southern, both to Iowa melters. Practically all the iron sold during the week went on a basis of \$10.25, Birmingham, for the Southern except the Iowa sales. The Northern iron ruled at about \$13, Iron-ton, and \$13.50, Chicago, the latter for No. 2 X. A number of inquiries which were in the market during the week for larger lots were withdrawn toward the close, the melters being disposed to wait as long as possible to see if prices will not go lower. Some representatives are still holding at \$10.50, Birmingham, and in a few instances even \$11. No business for last quarter is being sought at the prices noted. Total sales for the week were about 7500 tons.

Old Material.—Dealers are inclined to look for reductions rather than increases in the old material market. The railroads continue to push out large lots of scrap, the latest list being one of 2400 tons from the Burlington. Readjustment of labor conditions, too, is having a bearish effect and the impression prevails that it will be well into July before there is any change in the situation. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton		
Old iron rails	.....	\$10.50 to \$11.00
Old steel rails, re-rolling	.....	10.50 to 11.00
Old steel rails, less than 3 ft.	.....	10.00 to 10.50
Relaying rails, standard section, subject to inspection	.....	21.00 to 23.00
Old carwheels	.....	10.50 to 11.00
No. 1 railroad heavy melting steel scrap	.....	9.75 to 10.25
Shoveling steel	.....	7.50 to 8.00
Frogs, switches and guards cut apart	.....	9.50 to 10.00
Bundled sheet scrap	.....	4.25 to 4.75

Per Net Ton		
Iron angle bars	.....	\$9.50 to \$10.00
Steel angle bars	.....	8.00 to 8.25
Iron car axles	.....	16.75 to 17.25
Steel car axles	.....	11.75 to 12.25
Wrought arch bars and transoms	.....	10.50 to 11.00
No. 1 railroad wrought	.....	7.50 to 7.75
No. 2 railroad wrought	.....	7.25 to 7.50
Railroad springs	.....	8.00 to 8.75
Steel couplers and knuckles	.....	8.25 to 8.75
Locomotive tires, 42 in. and over, smooth	.....	8.75 to 9.25
No. 1 dealers' forge	.....	7.25 to 7.75
Mixed borings	.....	3.25 to 3.75
No. 1 busheling	.....	4.75 to 5.25
No. 1 boilers, cut to sheets and rings	.....	5.25 to 5.75
No. 1 cast scrap	.....	8.50 to 9.00
Stove plate and light cast scrap	.....	7.00 to 7.50
Railroad malleable	.....	7.00 to 7.50
Agricultural malleable	.....	6.50 to 7.00
Pipes and flues	.....	5.00 to 5.50
Railroad sheet and tank scrap	.....	5.00 to 5.50
Railroad grate bars	.....	4.50 to 5.00
Machine shop turnings	.....	4.25 to 4.75

Coke.—A number of foundry coke contracts were closed during the week, mostly renewals of expiring contracts, these being on a basis of \$2.50 at oven for best 72-hr. selected Connellsville, about 5000 tons being involved. A sale of 3000 tons is pending. By-product coke stands at \$5.20, delivered, St. Louis.

Finished Iron and Steel.—In this market a further improvement in the aggregate of business is noted and also in the general feeling. Demand for structural material is better and the fabricators report more business in prospect than for some time. No large orders for structural have been placed, but the aggregate of small orders is good at fairly steady prices. Bars are in fair demand, with insistence on quick shipment. Standard steel rails have been the best item in the list, the Frisco receivers having closed for about 32,000 tons of 90-lb. material and a Southwestern road for about 600 tons. Light rails are in good demand from the coal mines, and the lumber interests are showing a little more activity. The Wabash contract for 60 locomotives is lacking only the actual signatures to the contracts.

New York

NEW YORK, June 24, 1914.

Pig Iron.—One buyer comes into the market and contracts and then makes way for another, but there is none of the simultaneous buying by a good many melters, which marks a movement worthy of the name. On the whole, buying is not greater than that of a week ago; perhaps, in Eastern territory, it is a little less. One interest in New Jersey is in the market for a considerable amount and there is the inquiry of the leading electric interest in the East for a total of 12,000 to 13,000 tons for shipment in the third and fourth quarters, a considerable amount of high silicon iron being included and about 2500 tons of low phosphorus iron. From Buffalo furnaces shipments are being made by canal into Eastern territory and all the iron possible will go forward in that way, the freight being \$1.40 to \$1.50 as against \$2 by rail to Jersey City, with 50 cents lighterage added. Little important business is pending in New England. Virginia iron is a factor, though a small one, in New England territory and in eastern Pennsylvania. While \$12.75 at Virginia furnace is the schedule price for No. 2 X, which would make No. 2 plain \$12.50, the latter can be had at somewhat less than this figure. Buffalo sales are rarely at anything less than \$13 for No. 2 X, and in the ordinary run of business from foundries of moderate size the range has been from \$13 to \$13.50. The 76,000 tons of East River tunnel segments, which have long been before the trade, have been awarded by the general contractors in the past week, being about equally divided between the Wheeling Mold & Foundry Company, Wheeling, W. Va., and the New York Car Wheel Company, Buffalo. The \$26 figure at which the Hudson River tunnel segments were placed more than fifteen years ago, when labor and materials were very low, due to the depression of the eighteen-nineties, was much more nearly approached in the competition for the East River segments than had been commonly expected. The pig iron for the New York Car Wheel Company's part of the business just let will naturally come from Buffalo furnaces, though its exact destination is not given out. Deliveries will extend over two and a half years. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$14.75 to \$15; No. 2 X, \$14.50 to \$14.75; No. 2 plain, \$14.25 to \$14.50; Southern iron, \$15 to \$15.25 for No. 1 and \$14.75 to \$15 for No. 2.

Ferroalloys.—The market is dull and inactive, with inquiries and sales very few. Quotations remain unchanged at \$38, seaboard, for either German or English 80 per cent. ferromanganese, while 50 per cent. ferro-silicon is selling at \$71 to \$73, Pittsburgh, depending on the quantities asked for.

Cast-Iron Pipe.—The Warren Foundry & Machine Company was the successful bidder on 1250 tons on which bids were opened June 15 at Albany, N. Y., and

on a total of 2200 tons at Boston, Mass., on which bids were opened June 19. An indication that prices are about as low as pipe manufacturers are prepared to name appears in the fact that the bids received on the Boston pipe were close together, a difference of 5c. per ton having captured the business. The city of Belleville, N. J., will open bids June 30 on 200 tons of 6's and 12's. Winnipeg, Canada, will open bids on the same date on 3000 ft. of 12-in. and 3000 ft. of 14-in. A very heavy quantity of pipe, about 10,000 tons, is to be bought by the Isthmian Canal Commission, which will open bids July 7 for 2100 ft. of 24-in., about 40,000 ft. of 30-in., and about 20,000 ft. of 36-in. Private buying is a little better than it has been and foundries are feeling slightly more encouraged. Carload lots of 6-in. are still to be had at \$20.50 to \$21 per net ton, tidewater.

Finished Iron and Steel.—Orders on mills so far in June embrace a considerably heavier tonnage than for the same time in May, much of it for immediate requirements. Contracts with manufacturers, particularly for steel bars, are being closed very slowly, partly because the prices offered by buyers are not acceptable, partly because the mills are reluctant to contract beyond the third quarter, and partly because some buyers are taking the view that little is to be gained by contracting except at present bottom figures. What sales have been made in steel bars at a basis of 1.10c., Pittsburgh, are few and scattering, but little difficulty is met in purchasing at 1.12½c., Pittsburgh. Plates and structural material continue obtainable for merely fair tonnages at 1.10c., Pittsburgh, but much of the business appears to be done at 1.15c. Some plate business, it is admitted, has been closed at \$1 a ton under the ruling market, but there were unusually attractive features. Considerable smaller size structural work is being figured on, and the unusually low erection prices are beginning to attract investors and more is heard of a willingness to finance building work. In structural work interest attaches to the revival of the Metropolis bridge over the Ohio for the Illinois Central, involving 17,000 tons, and in railroad cars the Seaboard has ordered 440 box and 45 passenger cars of the Pressed Steel Car Company, and the Illinois Central has increased its recent purchase of 3000 box cars by 2000 additional, distributing these equally among the companies participating in the earlier purchase, namely, the Western Steel Car & Foundry Company, the American Car & Foundry Company, the Standard Steel Car Company and the Haskell & Barker Car Company. The Merchants Dispatch Transportation Company has decided to build 2000 more cars at its works at East Rochester, and the Wabash is authorized to negotiate for 1000 box cars and 500 box cars for which it will supply the trucks. The Pittsburgh, Shawmut & Northern is inquiring for 25 refrigerator cars. Structural awards for the week include a loft building, 784 Sixth avenue, 450 tons, and the Adler loft, 35 West Thirty-fifth street, 550 tons, both to Milliken Brothers; Pennsylvania Railroad bridge near Baltimore, 250 tons, and the Sixth street pier, Hoboken, 800 tons, both to the McClintic-Marshall Company; subway work for Holbrook, Cabot & Rollins Corporation, 665 tons, to the Lackawanna Steel Company; United Illuminating Company, New Haven, 400 tons, to the Berlin Construction Company; bridge work for the Baltimore & Ohio, 150 tons, to the Mt. Vernon Bridge Company; Exposition Building, Portland, Me., 500 tons, to the Eastern Bridge & Structural Company, Worcester, Mass. A Y. M. C. A. building in the Bronx borough, 500 tons, is up for figures, and also a garage for the Automobile Club, East Seventy-second street. We quote mill shipments of steel bars at 1.12½c. to 1.15c., Pittsburgh, or 1.28½c. to 1.31c., New York; plates and structural, 1.10c. to 1.15c., Pittsburgh, or 1.26c. to 1.31c., New York, and iron bars at 1.22½c. to 1.27½c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plates and shapes at 1.85c. to 1.90c.

Old Material.—Sales of scattering lots, rarely larger than carloads, constituted the business of the past week. Dealers report a continued lack of interest among large consumers with regard to contracting for future sup-

plies, an inquiry for 500 tons of cast scrap being especially noteworthy for this reason. The following are dealers' quotations, per gross ton, New York:

Old girder and T rails for melting	\$8.00 to \$8.50
Heavy melting steel scrap	8.00 to 8.50
Relaying rails	21.50 to 22.00
Rerolling rails	10.00 to 10.50
Iron car axles	17.50 to 18.00
Steel car axles	11.75 to 12.25
No. 1 railroad wrought	10.00 to 10.50
Wrought-iron track scrap	9.00 to 9.50
No. 1 yard wrought, long	8.50 to 9.00
No. 1 yard wrought, short	8.00 to 8.50
Light iron	3.25 to 3.50
Cast borings	5.50 to 5.75
Wrought turnings	5.25 to 5.50
Wrought pipe	7.50 to 8.00
Carwheels	9.50 to 10.00
No. 1 heavy cast, broken up	10.25 to 10.75
Stove plate	7.50 to 8.00
Locomotive grate bars	6.00 to 6.25
Malleable cast	7.25 to 7.75

German Conditions No Better

Pig-Iron Prices Reduced—Heavy Pig-Iron Output—Still Working on Combinations

BERLIN, June 12, 1914.

The Pig Iron Syndicate has given out its prices for the next quarter and has made reductions more extensively than had been expected in view of its recent decision to leave prices unchanged. Hematite and foundry iron were reduced variously from 50 pfennigs (12c.) to 2.50 marks (59c.) a ton. Luxemburg foundry was also reduced 2 to 2.50 marks (48 to 59c.). Sales at the reduced prices began in all the various districts several days ago.

The production of pig iron in May amounted to 1,607,000 metric tons. This is a gain of 73,000 tons over April and is only 36,000 tons less than for May, 1913. For five months the make reached 7,756,900 tons, which was only 209,500 tons less than a year ago. The average daily production in May was 51,845 tons, which is 698 tons more than for April and the highest average since December. The impression prevails that production will show no further shrinkage.

The imports of iron ores in May amounted to 1,185,000 metric tons, or about 83,000 tons less than a year ago. In the Silesian district dealers are having difficulties in getting the furnaces to place orders as hitherto. From the Luxemburg-Lorraine district a rather weak tendency for ores is reported. The course of trade in Siegerland ores is normal and has shown no changes.

The May export figures for the leading classes of iron and steel do not make a favorable comparison with those of last year. They are as follows: Pig iron, 53,000 tons, against 72,950 tons last year; ingots, blooms, billets, etc., 49,400 tons, against 55,200 tons; girders, 28,800 tons, against 44,300 tons; other structural shapes and bars, 84,800 tons, against 89,800 tons; steel rails, 41,700 tons, against 50,000 tons; ties, 12,000 tons, against 11,000 tons.

No substantial progress can be reported regarding the negotiations for organizing the various branches of finished products. A meeting of the tube manufacturers had been appointed for the beginning of the week, but it was postponed at the instance of Thyssen, who insists upon awaiting the outcome of the efforts to organize the other branches before taking up tubing. A meeting of the sheet manufacturers was held at Dueseldorf several days ago, at which over 60 establishments were represented or a large majority of the concerns interested. It is understood that several great establishments which have only recently increased their sheet producing capacity are adopting a similar attitude here as in the case of heavy plates and bars, namely, they are not content to have their quotas fixed upon a basis of their average production for 12 months selected out of the period that has elapsed since January, 1912, but demand allotments more in keeping with their present producing capacity. A special committee was appointed to deal with these mills, and another general meeting is to be held next week.

The difficulties in the way of organizing the sheet trade are recognized as being very great. The big

quota demands for the new mills recently erected by some of the great mixed works of the Union are not the only obstacle. The competition of these big concerns has driven many of the smaller sheet mills into the manufacture of high-grade qualities, and this will have to be taken into consideration in making allotments. The difficulties are also very great in heavy plates. In bars and wire the prospects for trade organizations are looked upon as considerably better than in other branches. It is understood that band iron is to be included in the organization of the bar trade. General meetings in heavy plates, bars, and wire and wire products are also to be held next week.

From the Belgian export market firm prices are reported, with the exception of heavy plates and sheets. It is mentioned, however, that incoming foreign orders were considerably less last week than previously.

British Reports Slightly Better

Pig Iron Firm and Better Inquiry for Steel—Mexican Tin Plate Orders

(By Cable)

LONDON, ENGLAND, June 24, 1914.

Cleveland iron is quiet but firm on the limited output. Continental steel generally shows an easier tendency, especially bars. A rather better feeling has appeared for British steel although the demand for semi-finished steel remains slow. Mexican orders for tin plates have been taken by Wales on the basis of 12s. 3d. (\$2.98) for quarters. The German production of tin plates is increasing largely and is expected to total 14,000 tons monthly by December, thus providing an exportable surplus. Receipts of tin plates at Swansea were 139,000 boxes and shipments 146,000 boxes, thus leaving stocks of 135,139 boxes. Stocks of pig iron in Connal's stores are 81,925 gross tons, against 85,597 tons a week ago. The Steel Corporation has booked an order for 10,000 tons of rails for Siam. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 11s. 10½d. (\$2.89), against 12s. (\$2.92) a week ago.

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 51s. 3d. (\$12.47), against 51s. 1d. (\$12.43) a week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 51s. 9d. (\$12.59), against 51s. 6d. (\$12.53) a week ago.

Hematite pig iron, f.o.b. Tees, weak at 59s. (\$14.35), against 60s. 6d. (\$14.72) a week ago.

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. (\$21.89).

Steel bars, export, f.o.b. Clyde, £5 17s. 6d. (\$28.59).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 12s. 6d. (\$27.37).

Steel ship plates, Scotch, delivered local yards, £5 12s. 6d. (\$27.37), against £5 13s. 9d. (\$27.67) a week ago.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 15s. (\$42.58).

Steel rails, export, f.o.b. works port, £5 15s. (\$27.98).

The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.:

German sheet bars, f.o.b. Antwerp, 78s. (\$18.98).

German 2-in. billets, f.o.b. Antwerp, 73s. (\$17.75).

German basic steel bars, f.o.b. Antwerp, £4 3s. to £4 4s. (\$20.19 to \$20.43) for prompt shipment and £4 5s. to £4 7s. (\$20.67 to \$21.16) for forward delivery, a reduction of 1s. (24c.) all round.

German joists, f.o.b. Antwerp, £5 2s. to £5 5s. (\$24.82 to \$25.55).

Freight rates from Antwerp to New York, Boston, Philadelphia and Baltimore, per 1000 kilos (2204 lb.), are about as follows: Billets, blooms and bars, up to 20 ft., 9s. to 10s. (\$2.19 to \$2.43). Iron and steel sheets, 11s. to 12s. 6d. (\$2.68 to \$3.04). Beams up to 30 ft., 12s. 6d. (\$3.04).

(By Mail)

Spanish Iron Ore Surprisingly Strong — Low-
Priced Sheet Bars

LONDON, June 12, 1914.

The one surprise in the iron trade has been the strength of Rubio ore the past week. A short time ago 50 per cent. grade material was quoted down to 17s. (\$4.14) a ton, and there was no scramble to buy, whereas there has now developed a much stronger feeling which has admittedly come as a surprise even to those most closely concerned in the trade, and this week the equivalent of 17s. 4½d. (\$4.23) c. i. f. Middlesbrough has been paid. Further business is pending, too, at about this price, while the Germans are still asking for ore on five-year contracts and are booking some business. The strike in the Spanish shipping trade has been responsible to some extent for the upward move in prices, for shipments from Bilbao have been delayed considerably. Another potent factor has been the closing down of mines in Spain because present selling prices are regarded as too low. Under all the circumstances and in view of the curtailment of production of pig iron in the Cleveland area it is not surprising that pig-iron prices are maintained. No new buying is in evidence unless a few scattered lots of 500 tons or so are to be dignified with that appellation. Stocks are small and show no decided tendency in any direction, and chances of manipulation to create an artificial speculative position are meagre. In fact transactions have fallen to almost a minimum. A good many of the furnaces are still closed down and increase of production at the present time seems out of the question.

SHEET BARS AT \$18.50—STEEL BARS A LITTLE FIRMER

There has been a slightly firmer tone in semi-finished steel, but in terms of money it does not amount to much. There are still low French sellers and the Germans and Belgians are not averse to taking low prices when substantial business is offered. The Germans are understood to have accepted about 76s. (\$18.49) f.o.b. for a 25,000-ton lot of sheet bars from West Coast makers of galvanized sheets, and some of the tin-plate people are in the market now for 10,000 tons for delivery this year. This shows that there is a tendency in some directions for consumers to cover themselves at present rates, and they can hardly be making a mistake. The Germans are pretty confident that good will result from the negotiations in connection with the extension and prolongation of the Stahlwerks Verband, and anticipates really great things from the rearrangement which would follow from an agreement here reached as regards bars, plates, etc.

In finished material a firmer tone in bars is apparent, and a lot of merchants have now covered themselves pretty well. Prices vary considerably according to the individual works and some large German makers quote 90s. (\$21.90) f.o.b. for basic bars for last quarter, but there are sellers elsewhere at 88s. (\$21.41) if not at 87s. (\$21.17) f.o.b. This section of the market has been most affected by the Verband negotiations, the tone in other directions not having been altered much; indeed, at the time of writing, plates and sheets are a little easier than they were. There does not seem to be any change in the broad position. General buying is poor, and there is not much confidence, although it is recognized that there cannot be much if any reduction from the ruling level of prices. The heavy steel people are wanting orders and the new incursion of the United States Steel Corporation into the rail department is not at all relished. That 35,000-ton order for Australia was wanted pretty badly by the home makers.

The Nordberg Mfg. Company, Milwaukee, Wis., is making delivery of what is considered the largest compound condensing steam hoist ever constructed to the Homestake Mining Company, Lead, S. D. Twenty-four cars were required for the shipment. The hoist has a capacity of raising 12,000 lb. of ore 3200 ft. per min., and the rope pull is 42,000 lb. It was designed by Bruno V. Nordberg, president and chief engineer.

Metal Market

NEW YORK, June 24, 1914.

The Week's Prices

Cents Per Pound for Early Delivery								
Copper, New York			Electro-lytic		Tin, New York		Lead, New York	
June	Lake	17s.	18s.	19s.	20s.	21s.	22s.	23s.
17	14.12½	13.87½	30.40	3.90	3.80	5.10	4.95	
18	14.12½	13.87½	30.55	3.90	3.80	5.10	4.95	
19	14.12½	13.87½	30.45	3.90	3.80	5.10	4.95	
20	14.12½	13.75	30.37½	3.90	3.80	5.10	4.95	
22	14.12½	13.75	30.60	3.90	3.80	5.10	4.95	
23	14.12½	13.75	30.75	3.90	3.80	5.05	4.90	

The copper market is stagnant and electrolytic is lower. Tin is higher, but buying has been light and of spot only. Lead is unchanged. Spelter is dull and off a few points. Antimony is weaker in the absence of demand.

New York

Copper.—The market has been stagnant for some days and the discouragement of sellers in the latter part of last week caused them to drop their quotation of electrolytic ½c. to 14.75c., cash, New York, or 14.87½c., delivered, 30 days. The decline was not publicly announced, but the lower prices were offered to such an extent by first hands as to make the market. In the absence of buying and with all pressure to sell also lacking, the quotation for prime Lake continues nominal at 14.12½c., although inferior grades of Lake can be had at 14c. or less. Prices in Europe are weak also, the quotations to-day being £60 18s. 9d. for spot and £61 11s. 3d. for futures. Exports keep up well against the heavy contracts entered a few weeks ago. Exportations of this month total 27,747 tons.

Tin.—Practically the only orders placed have been a moderate number for prompt and very early deliveries, indicating a depletion of stocks in the hands of consumers, otherwise the market has been very dull. Consumers seem to have no confidence in the situation as they are showing absolutely no interest in futures, despite the low price. All sides are looking for further developments and the general feeling is that there will not be much business while this attitude is maintained. The tin plate mills are taking good deliveries against contracts, but these will soon be liquidated after which there is likely to be an active market for early delivery metal. The New York price yesterday was 30.75c. The London quotations to-day are £139 12s. 6d. for spot and £141 7s. 6d. for futures. The arrivals this month amount to 2750 tons and there is afloat 1793 tons.

Lead.—The extreme quiet in this metal is unabated and sellers are complaining of the lack of orders. The prices are unchanged at 3.90c., New York, and 3.80c., St. Louis. The London price to-day is £19 7s. 6d.

Spelter.—The market is five points lower at 5.05c., New York, and 4.90c., St. Louis. Business is dull and some apprehension is felt over the threatened difficulties with the employees of the sheet mills, though at the same time it is hoped that some adjustment may be reached which will avert actual troubles.

Antimony.—Quotations are off a few points with Cookson's nominal at 7c. to 7.12½c., Halletts, 6.75c. to 6.87½c. and other grades at 5½c. to 6c. The stock in bonded warehouses is large, but it would not be considered excessive if the demand were good.

Old Metals.—The market is very quiet. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	13.00 to 13.25
Copper, heavy and wire	12.50 to 12.75
Copper, light and bottoms	11.50 to 12.00
Brass, heavy	8.50 to 8.75
Brass, light	7.00 to 7.25
Heavy machine composition	11.75 to 12.00
Clean brass turnings	8.50 to 8.75
Composition turnings	10.50 to 10.75
Lead, heavy	3.70
Lead, tea	3.40
Zinc scrap	3.85

Chicago

JUNE 22.—Quotations for copper metal continue to reflect declining values and the general lack of interest

in anything but what is suggested by immediate requirements. An unimportant reaction in tin brought a turn to higher prices and we quote a fractional advance. Features of interest are lacking in every branch of the market. We have revised our quotations and quote as follows: Casting copper, 13.75c. to 14c.; Lake copper, 14c. to 14.25c. for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{1}{2}$ c. higher; pig tin, carloads, 31 $\frac{1}{2}$ c.; small lots, 33 $\frac{1}{2}$ c.; lead, desilverized, 3.85c., and corroding, 4.10c., for 50-ton lots; in carloads, 2 $\frac{1}{2}$ c. per 100 lb. higher; spelter, 5c.; Cookson's antimony, 9.50c. for cask lots; other grades, 8c.; sheet zinc, \$7, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 11.50c.; copper bottoms, 10.25c.; copper clips, 10.75c.; red brass, 10.75c.; yellow brass, 7.50c.; lead pipe, 3.30c.; zinc, 3.50c.; pewter, No. 1, 23c.; tinfoil, 26c.; block tin pipe, 29c.

St. Louis

JUNE 22.—While the metal markets eased off a little in the week, there was a better feeling toward the end with the result that the close to-day was firm at 3.80c. for lead, Missouri product, and sales were readily made at that figure. Spelter closed at 4.90c., steady in tone. In the Joplin ore market a shortage of labor is developing as a result of an exodus to the harvest fields for higher pay, and this is having its effect on production. The basis range for 60 per cent. ore was \$39 to \$41 per ton, but very little went at the lower price and the market as a whole was at least \$1 per ton better than the preceding week. The top settlement price was \$44 per ton. Calamine was steady at \$22 to \$23 per ton for 40 per cent. metallic content, with the top settlement made at \$27 per ton for the choice ores. Lead was rather quiet for the most part, but the tone was a little better and the price was \$46 per ton for 80 per cent. galena. On the St. Louis market tin closed easy and quiet at 30.60c. to 31.10c.; Lake copper, nominal, about 10c. higher than electrolytic, which latter closed steady at 14.10c. to 14.35c.; Cookson's antimony, dull at 7.60c. @ 7.72 $\frac{1}{2}$ c. Miscellaneous scrap metals we quote as follows: Light brass, 5.50c.; heavy yellow brass, 7.50c.; heavy red brass and light copper, 9.50c.; heavy copper and copper wire, 10.50c.; zinc, 3c.; lead, 3.25c.; tea lead, 3c.; pewter, 21c.; tinfoil, 25c.

Iron and Industrial Stocks

NEW YORK, June 24, 1914.

Notwithstanding an apathetic condition among dealers in securities, a gradual hardening of values is perceptible. This was somewhat quickened on Monday when the Supreme Court announced an important decision in favor of the Southern Pacific Railroad which would perhaps have had greater effect but for another decision of the Supreme Court sustaining the Interstate Commerce Commission's ruling in the intermountain rate case. The opinion is gaining ground that the values of stocks cannot fail to be strengthened as the extraordinary crops now being raised are harvested. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., pref..	42 $\frac{1}{2}$ - 43 $\frac{1}{4}$	Nat. En. & St., com....	11
Am. Can, com....	27 $\frac{1}{2}$ - 28 $\frac{1}{4}$	Pressed St'l, com.	43 $\frac{1}{4}$ - 43 $\frac{3}{4}$
Am. Can, pref..	91 - 92 $\frac{1}{4}$	Republic, com....	22 $\frac{1}{2}$ - 23 $\frac{1}{4}$
Am. Car & Fdy.,		Republic, pref....	86 - 86 $\frac{1}{2}$
com.....	51 $\frac{1}{2}$ - 52 $\frac{1}{4}$	Rumely Co., com.....	10
Am. Car & Fdy., pref..	117 $\frac{1}{2}$	Rumely Co., pref.	26 $\frac{1}{2}$ - 27 $\frac{1}{4}$
Am. Loco., com....	31 - 31 $\frac{1}{2}$	Pipe, pref.....	36
Am. Loco., pref..	99 - 100 $\frac{1}{4}$	U. S. Steel, com.	61 - 62 $\frac{1}{2}$
Bald. Loco., pref..	106 $\frac{1}{2}$	U. S. Steel, pref.	109 $\frac{1}{2}$ - 109 $\frac{3}{4}$
Beth. Steel, com.	41 $\frac{1}{2}$ - 43	West'h'se Elec....	75 $\frac{1}{2}$ - 76 $\frac{1}{4}$
Beth. Steel, pref.	83 $\frac{1}{2}$ - 84	Am. Ship, com.....	35
Case (J.I.), pref.	88 - 88 $\frac{1}{2}$	Chic. Pneu. Tool.	53 $\frac{1}{2}$ - 53 $\frac{3}{4}$
Colorado Fuel....	27 - 27 $\frac{1}{4}$	Cambria Steel....	47 $\frac{1}{2}$ - 48 $\frac{1}{4}$
Deere & Co., pref....	94	Lake Sup. Corp.	16 $\frac{1}{2}$ - 17 $\frac{1}{4}$
General Electric.	147 $\frac{1}{2}$ - 148 $\frac{1}{4}$	Pa. Steel, pref.....	64 $\frac{1}{2}$
Gt. N. Ore. Cert..	30 $\frac{1}{2}$ - 32 $\frac{1}{4}$	Warwick.....	9 15/16 - 10
Int. Harv., com....	106 $\frac{1}{2}$ - 107 $\frac{1}{4}$	Cruc. Steel, com.	16 $\frac{1}{4}$ - 16 $\frac{1}{2}$
Int. Harv., Corp.	104 $\frac{1}{2}$ - 105 $\frac{1}{4}$	Cruc. Steel, pref.	90 $\frac{1}{4}$ - 92 $\frac{1}{2}$
Int. Harv., Corp., pref.	115	Harb. Wk. Ref., pref..	99
Int. Pump, com.....	4	La Belle Iron,	
Int. Pump, pref.	11 $\frac{1}{2}$ - 11 $\frac{3}{4}$	com.....	30 $\frac{1}{4}$ - 32

Dividends Declared

The American Road Machinery Company, regular quarterly, 1 $\frac{1}{2}$ per cent. on the preferred stock, payable August 15.

The Yale & Towne Mfg. Company, regular quarterly, 1 $\frac{1}{2}$ per cent., payable July 1.

The American Seeding Machine Company, regular quarterly, 1 per cent. on the common stock and 1 $\frac{1}{2}$ per cent. on the preferred, both payable July 15.

The E. W. Bliss Company, regular quarterly, 1 $\frac{1}{4}$ on the common stock and 2 per cent. on the preferred, both payable July 1.

The Canadian Car & Foundry Company, Ltd., regular quarterly, 1 $\frac{1}{4}$ per cent. on the preferred stock, payable July 15.

Manning, Maxwell & Moore, Inc., regular quarterly, 1 $\frac{1}{2}$ per cent., payable June 30.

The National Enameling & Stamping Company, regular quarterly, 1 $\frac{1}{4}$ per cent. on the preferred stock, payable June 30.

The Nova Scotia Steel & Coal Company, Ltd., regular quarterly, 1 $\frac{1}{2}$ per cent. on the common stock and 2 per cent. on the preferred, both payable July 15.

The Safety Car Heating & Lighting Company, regular quarterly, 2 per cent., payable July 1.

The Standard Coupler Company, 4 per cent. on the preferred stock, payable June 30.

The Standard Screw Company, 2 $\frac{1}{2}$ per cent. on the common stock, 3 per cent. on the preferred stock class A, and 1 $\frac{1}{4}$ per cent., regular quarterly, on the preferred class B, all-payable July 1.

The Pittsburgh Gage & Supply Company, quarterly, 2 per cent., payable July 1.

Safeguards in Pennsylvania Industries

The State Industrial Board of Pennsylvania has arranged for a meeting in Philadelphia, June 26, of a committee to draft rules and regulations for safeguards in industries having blowers and exhausters, especially from swing chain emery wheels. A committee began last week to compile rules for safety standards in regard to cranes, hoists and conveying machinery. The committee is composed of Roy F. Gale and W. E. Firth, Midvale Steel Company; Walter E. Chick, Pennsylvania Steel Company; Walter R. Linn, Pennsylvania Manufacturers' Association; Walter A. Hall, Yale & Towne Mfg. Company; A. D. Carnagh, John A. Roebling's Sons Company; William Taylor Poulterer, Philadelphia Electric Company; A. S. Bentz, Valley Railways and United Electric Company; E. L. Haynes, William Sellers & Co., Inc.; John H. Frank, Middletown Car Company; E. H. Schell, Gilbert & Son; Elmer B. Tolsted, Independence Inspection Bureau.

A number of important regulations in regard to safety in electrical machinery will be drafted during the summer and submitted to the Industrial Board. A committee is now making a study and its recommendations will affect almost every industry using power in the State. The committee, which is co-operating with State officials, is composed of Charles W. Parkhurst, superintendent electrical department, Cambria Steel Company; R. F. Patterson, electrical engineer, Pressed Steel Car Company; A. P. Van Kirk, Westinghouse Air Brake Company; James B. Douglas and M. G. Kennedy, United Gas Improvement Company; H. W. Forster, Independence Inspection Bureau, and Messrs. Chick, Linn, Poulterer and Tolsted, of the hoisting committee.

The Chicago Tube & Iron Company, Chicago, has been incorporated with a capital stock of \$50,000, to buy and sell boiler tubes, copper ferrules, iron and steel sheet and terne plate. The incorporators are W. G. Morgan, M. Kasulis and E. M. Peter.

The Strong, Carlisle & Hammon Company has been appointed distributors in Cleveland and surrounding territory of Toledo (Sheffield) high speed and carbon tool steels, made by Jno. Hy. Andrew & Co., Ltd., Sheffield, England.

Mechanical Engineers for Public Service

(Continued from page 1585)

Wilfred Lewis, president Tabor Mfg. Company, Philadelphia, describing the design of a gear testing machine, appreciation was expressed of Mr. Lewis' work in this connection, involving the expenditure of a considerable amount of his own funds. Such work as this was pointed out as one of the avenues in which the society might better spend money now being used in other directions. Prof. A. G. Christie, University of Wisconsin, Madison, Wis., called attention to the experimental stations maintained by many of the State universities, which were available for such work as Mr. Lewis had done and for which funds were provided by the State.

POSSIBLE USE OF MINNESOTA PEAT FOR COKE

The lecture on iron ore handling given in the evening by John Hearing, assistant general manager of the Oliver Iron Mining Company, was a story told in pictures of the methods of the Mesaba range. The films covered the operations from the work of setting up diamond drills for locating the mines, the manner in which the surface is stripped from open pits and hauled away, the blasting of ore and loading into cars by steam shovels, together with panorama views of the mines. A series of views of underground mining were especially interesting, as were scenes taken from the logging operations which supply timbers for underground workings. In introducing Mr. Hearing, Max Toltz, of St. Paul, who is the engineer responsible for the design of the Hill railroad ore docks at Duluth, remarked on experiments now under way in Minne-

Tabulated Abstract of Discussions on Pulverized Coal

	J. L. Agnew, Cement Industry	Wm. R. Dunn, Vulcanite Portland Cement Company	J. V. Culliney,* American Iron & Steel Mfg. Company	Wm. A. Evans, Griscom-Russell Company	W. P. Barba, Midvale Steel Company	H. G. Barnhurst,† Fuller Engineering Company	A. W. Raymond
Grades of coal	Volatile matter 39 Fixed carbon 53 Ash 8 Sulphur 2 B.t.u. 13,600	Volatile matter 34.50 Fixed carbon 57.50 Ash 8.50 Sulphur 1.20 Use gas slack above 28% volatile matter.	Volatile matter 33 Fixed carbon 56 Ash 9 Sulphur 1 Moisture 1 For heating and puddling furnaces, the higher the volatile matter the better.	Volatile matter should be at least 20%.	Use gas coal and gas slack. Volatile matter 35.40 Ash 6.8 Sulphur Low	Volatile matter 35 Ash 8 Sulphur 1.5 In cement work coal as high as 25% ash and 5% sulphur gave satisfactory results.	For open hearth two grades of coal in use. Vol. matter 37 Ash 10 Sulphur 0.5 Moisture 1.5 Cost \$2.50 \$3.35 For annealing ovens: Volatile matter 24.6 Ash 19.05 Sulphur 3.53 B.t.u. 11,000
Ash in coal	Great importance. Sticks at furnace throat in pasty condition. When as high as 10% it accumulates. Same settles as fine dust in flue chamber beyond throat. 70 tons of coal per 24 hour yields 400 to 500 lb.		Should be kept low. Ash deposits in combustion chamber. Very little goes up stack. Forms pasty slag. Should be removed several times daily. Ash causes little trouble in furnaces maintaining temperature 2500 deg. F. and over. Use of hood over door with suction fan and collector for ash.	Where ash does not affect product may be as high as 18 to 20%. Most furnaces of rotary type, 8 to 10%. More refined treatment as copper and open hearth, 3 to 4%.	High ash objectionable. Ash removed every few hours. Slag removed several times per week.		Low ash desirable because of cost of handling and preparing.
Sulphur in coal	Unimportant.	Troublesome.			Sulphur troublesome.		Sulphur harmless, except as it affects material in furnace.
Storage bins			Dry pulverized coal can be stored indefinitely. Dampness induces spontaneous combustion. Coal should be under roof. Storage sheds should have side openings to promote evaporation of moisture. Hoppers should have two vertical sides; others 30-deg. angle to prevent arching. Arching varies with moisture.	Storage should carry 14-16-hr. supply. Pulverized coal should be kept in motion.	Bins should have sharp slope. Combustion may start inside of 96 hr.		Should have 24-hr. capacity. Coal can be stored a week without danger. Must be dry and at low temperature.
Burner	Good control prime essential.		Essentials of good burner: 1. Uniform feed. 2. Proper mixture. 3. Proper control. 4. Simplicity. 5. Compactness.	Essentials of good burner: Uniform feed of air and coal. Uniform mixture and control. Burners must be within 5 ft. of furnace. Combustion space at least 1 cu. ft. per 3 lb. coal per hr.	Regular feed with easy and accurate control necessary. Chief difficulty is stoppage.	Regulation of feed most important.	Requirements: Close regulation, uniform mixture with air.
Air pressure	Air at 6 to 8 oz. to blow coal in. Combustion air drawn in through openings at atmospheric pressure.		High pressure blast should range from 4 to 6 oz. Low pressure blast should range from 1 to 2 oz. In experimental work start with low pressure, increasing gradually. Furnaces operated at low pressure last longest.		Air pressure not over 4 to 6 oz.		Blast from blower gives longer life of furnace; from compressor gives higher temperature.

sota, to which considerable significance may attach. Mr. Toltz stated that it is James J. Hill's hope that the near future will see the making of pig iron on a much larger scale in Minnesota. Experiments have progressed sufficiently in the manufacture of coke from the immense peat beds of Minnesota to warrant the expectation that the operation of blast furnaces in Minnesota will be made feasible and practicable through the use of this fuel.

ELECTRIC SMELTING OF IRON ORE

The opportunity at hand for visiting the high dam at Minneapolis gave to the paper descriptive of the power development work there a special interest at the Thursday morning session. In the discussion of the paper the opinion was offered that stream control reservoirs are of little practical benefit to navigation and should rather be operated as auxiliary to the water power plant, thus making

unnecessary the construction of excessively large auxiliary steam plants. The morning session also brought out the interesting fact that at the University of Minnesota preparations have been made for extensive experiments in electric smelting of iron ore. Concerning these experiments, E. P. Burch, consulting engineer of Minneapolis, spoke at some length.

Luncheon was served at the University of Minnesota, and the afternoon and evening were spent at the country estate of Gebhard Bohn on Lake Minnetonka, near Minneapolis. Friday morning was given to technical excursions in the Twin Cities and at 2:30 a trip to Duluth was scheduled.

The Clarage Foundry & Machine Company, Kalamazoo, Mich., maker of fans, blowers, heaters, etc., has opened a branch office at 149 Broadway, New York, to take care of its Eastern business.

Tabulated Abstract of Discussions on Pulverized Coal—Continued

	J. L. Agnew, Cement Industry	Wm. R. Dunn, Vulcanite Portland Cement Co.	J. V. Culliney,* American Iron & Steel Mfg. Company	Wm. A. Evans, Griscom-Russell Company	W. P. Barba, Midvale Steel Company	H. G. Barnhurst,† Fuller Engineering Company	A. W. Raymond
Temperature	Working temperature at hottest point, 2800 deg. 5 to 6 tons of material per ton of coal. Slag should run 33-35% silicon. Develops 500 hp. per 70 tons per day waste heat. Life of furnace prolonged with use of pulverized coal.					Temperature from 1800 to 3500 deg. F.	
Preheating of air			Preheating will save about 15% of coal used. Preheating to 600 deg. F. gives 1. More heats per hour. 2. Higher furnace temperature. 3. Uniform temperature. 4. Less ash on hearth.				
Drying coal	Moisture detrimental: 1. Reduces capacity of grinders. 2. Coal tends to pack in bins. 3. Lowers temperature possible. 4. Lessens efficiency.		Coal should be dry before grinding. After grinding percentage of moisture not to exceed 0.5%.	Dryers essential. Impossible to handle coal over 2% moisture.		Must be dried to less than 1% moisture to prevent clogging and secure high temperature.	Moisture not to exceed 11%. Economy in furnace depends on dryness.
Fineness of grinding	95% through 100 mesh. 80% through 200 mesh.		95% through 100 mesh.	95% through 100 mesh. 80% through 200 mesh.	95% through 100 mesh. 80 to 85% through 200 mesh.	95% through 100 mesh. 80% through 200 mesh.	Exact value of fineness not yet determined. Success has been attained with coal coarser than 95% through 100 mesh. Great fineness means high cost of preparation.
Cost of grinding	To grind and deliver: Labor \$0.15 Power 0.10 Repairs 0.145 Coal for dryer 0.055 \$0.45	140 tons per 24 hr. Labor, operating dept. 15.64c Labor, repairs 1.70 Supplies, fuel, power, etc. 14.71 Oil and waste 1.25 Repairs 4.54 37.84 Interest and depreciation 1.35 39.19c	150 tons per 24 hr. Cost of grinding and delivering, 40c per ton.	Cost, 40 to 45c. per ton.		Cost, 18 to 24c. per ton, plus overhead, interest and depreciation.	Fineness: 95% 99% 1 ton per hr. 24.6c 49.2c 25 ton per hr. 11.4c 18.8c Cost depends on size of plant.
Danger of dust in air			Only dangerous in suspended state.		Grinding building should be as open as possible.	Explosion can occur only through carelessness. Slight vacuum in furnace and pipes will prevent leakage.	Dangerous if grinding room becomes impregnated with dust. Can be avoided.

*American Iron & Steel Mfg. Company has been using about 260 gross tons per day pulverized coal for 9 years.
Advantages of use of pulverized coal:
1. Perfect combustion.
2. No handling of coal or ash.
3. No packing or clinkering.
4. Constant and uniform temperature

†Life of pulverized coal furnace equal to hand or oil fired.
Saving in economy of operation:
Billet furnace 20 to 25%
Open hearth 30 to 40%
Puddling 33 to 50%
Heating and busheling 20 to 25%

PERSONAL

A. F. Huston, president Lukens Iron & Steel Company, plans to sail to Europe with his family, Saturday, June 27, on the Prinz Friedrich Wilhelm.

W. H. Donner and George V. Massey were elected directors of the Cambria Iron Company June 18, to succeed George F. Baer, deceased, and E. T. Stotesbury, resigned. The resignation of the treasurer, E. T. Stuart, who was recently elected treasurer of the Pennsylvania Steel Company, was accepted and Alexander P. Robinson, vice-president of the company, was elected treasurer.

Jonathan R. Jones, vice-president and treasurer Alan Wood Iron & Steel Company, Philadelphia, has returned home after a trip of several weeks to the Pacific coast.

Elmer E. Metzger has resigned the position of works manager with the Esterline Company, Indianapolis, Ind., and has been appointed works manager by the Geometric Tool Company, New Haven, Conn.

E. W. Alderman, an experienced refrigerating engineer who has been connected with the Vilter Mfg. Company, Milwaukee, Wis., for a number of years, has been appointed manager of the Pittsburgh district and will have his headquarters at 314 Curry Building, Pittsburgh. He succeeds H. W. Loecher, who has been transferred and will be located at the company's main office in Milwaukee.

William G. Mather, president Cleveland-Cliffs Iron Company, Cleveland, Ohio, sailed for Europe June 20.

W. L. Jack, who recently resigned as treasurer of the Riter-Conley Mfg. Company, Pittsburgh, has been elected vice-president of the Third National Bank of that city, and has assumed his duties.

Andrew Carnegie has given \$12,500 for the erection of a library in conjunction with the Edgewood Club of Pittsburgh.

G. A. Aiken, traffic manager for Spang, Chalfant & Co., Pittsburgh, operating the Etna Iron & Tube Works, has resigned, effective July 1, and will connect himself with a large concern in Pittsburgh making stamped metal specialties.

George P. Thomas, of the Standard Bridge Tool Company, Pittsburgh, builder of the Thomas spacing table, sailed for Europe June 20.

Thomas W. Warner, president Muncie Gear Company, Muncie, Ind., and founder of the Warner Gear Works of that city, has resigned, in order to give all his time to his auto parts factory at Toledo, Ohio, which employs 1400 men.

Ernst M. Fischer has been appointed New York manager of the Lindenberg Steel Company, 90 West street, New York, to succeed Curt A. Ziesing, who sailed for Europe June 15 to take the position of manager of the export department of the company at Remscheid, Germany. Mr. Fischer, who arrived here about four weeks ago, was engaged in the steel business in England before becoming connected with the Lindenberg Steel Company.

F. E. Pierce announces that he has terminated his connection with the New Jersey Zinc Company after 15 years of continuous service, in the latter part of which he was chief engineer. He has established an office as consulting civil and metallurgical engineer at 35 Nassau street, New York.

In connection with new financing recently carried out by the Canada Machinery Corporation, Ltd., Galt, Ont., whereby \$150,000 additional working capital was provided by the shareholders, certain changes in the management have taken place through the retirement of T. F. Kenny as general manager, and in future T. H. Watson, the newly elected president, will assume these duties and take an active part in directing the company's affairs.

Alfred G. Smith, marine architect, Cleveland, Ohio, has been elected general manager of the American

Shipbuilding Company, succeeding R. B. Wallace, who resigned recently. He was formerly general superintendent of the Chicago Shipbuilding Company.

William Lauder, superintendent of the Colonial Iron Company, Riddlesburg, Pa., has retired after a service of 46 years with the company, during which time he took but five holidays. He began his connection with the company as a clerk. He is a member of the State Board of Education of Pennsylvania.

William Lewis has resigned as assistant superintendent of the Youngstown Iron & Steel Company, Youngstown, Ohio, to become construction superintendent at the plant of the Western Reserve Steel Company, Warren, Ohio.

J. B. Childe, manager of the finance and accounting departments of the Western Spring & Axle Company, Cincinnati, Ohio, has become manager of the Cleveland Axle Mfg. Company and the Cleveland-Canton Spring Company, Canton, Ohio. He will retain his connection with the Cincinnati company and divide his time between the two cities.

J. C. West, formerly local manager of the Sullivan Machinery Company at San Francisco, has been appointed general sales engineer, with offices at Chicago. He will be succeeded by Ray P. McGrath, formerly of the New England sales office at Boston.

A. L. Nash, of Crocker Brothers, New York, sailed June 20 for a vacation trip in Europe. He will return about August 1.

R. W. Read, heretofore Philadelphia sales agent of the Pennsylvania Steel Company, has been transferred to New York in view of the merging of the Philadelphia sales office with the general sales offices. R. W. Gillispie, who has been New York sales agent, has been made district sales manager and Mr. Read becomes assistant district sales manager.

OBITUARY

HENRY P. RALSTON, founder of the Ralston Iron Works, San Francisco, structural fabricator, died June 13 at his home in San Anselmo, Cal., aged 71 years. He was a native of Scotland, and went to California in 1866. In 1878 he bought out a foundry, which was incorporated under the present name in 1900. In 1904 he was succeeded as president of the company by his son, Harry J. Ralston.

JACOB C. SOTTER, head of Sotter Brothers, boiler manufacturers, Pottstown, Pa., died June 20, following an operation ten days before for acute appendicitis. He was an inventor of many devices pertaining to boilers and house heating and was a director in the National Iron Bank and several other corporations.

JOHN DAVEY, well known in the sheet and tin plate industry in Ohio, died in Massillon, Ohio, June 18, aged 64 years. He was father of William H. Davey, general manager of Massillon Rolling Mill Company.

THOMAS A. WHITE, president White Sewing Machine Company and director of the White Company and the Park Drop Forge Company, Cleveland, died June 22, aged 78 years.

East River Iron Segment Contracts Placed

The Flinn O'Rourke Company of Pittsburgh and New York City, formed by Booth & Flinn, Ltd., Pittsburgh, and the O'Rourke Engineering Construction Company, New York City, has divided a contract for about 75,000 tons of cast iron segments for East River tunnels for New York subway work, half going to the New York Car Wheel Company and the other half to the Wheeling Mold & Foundry Company, Wheeling, W. Va. The latter company will furnish the segments for route 48 and the New York Car Wheel Company will furnish the segments for route 33. The deliveries extend over two years.

Two Mineville Concentrating Mills Burned

The No. 1 and No. 2 concentrating mills of Witherbee, Sherman & Co., at Mineville, N. Y., were destroyed by fire on Wednesday, June 17. These were the oldest of the company's concentrators. For some time only No. 2 has been in operation. The No. 3 and No. 4 concentrating plants, which are in every way modern and of large capacity, were built with a view to taking care, in a 10-hour shift, of the entire output of the mines in two 10-hour shifts. Though the fire caused a complete loss of the two structures mentioned, with their equipment, the company will be able to continue shipments as usual, because of the surplus capacity of the No. 3 and No. 4 plants and the fact that the market is not now requiring full operation of its mines. The construction of a modern concentrating mill to replace Nos. 1 and 2 will be begun at once. The origin of the fire has not been determined. It was discovered at 6 o'clock at the top of one of the elevator shafts, soon after the men had left for the day.

British Iron and Steel Exports Continue to Fall

Great Britain's iron and steel exports for the first five months of 1914 again show a decrease both in tonnage and values from 1913. The total sent abroad to June 1, 1914, excluding iron ore and scrap, was 2,018,126 gross tons against 2,090,411 tons in the first five months of 1913, the decrease being 72,285 tons. The decrease in values was £1,956,250 or from £23,381,966 to £21,425,716. In pig iron, including ferroalloys, the decrease in exports was 31,632 tons, the total to June 1, 1914, being 422,811 gross tons against 454,443 tons. The exports of galvanized sheets were 11,809 tons greater to June 1, 1914, than for the first five months of 1913, or 331,879 tons against 320,070 tons.

Imports of iron and steel, excluding iron ore and scrap, to June 1, 1914, were 984,639 gross tons against 922,368 tons to June 1, 1913, a decrease of 62,271 tons. The values for these two periods were £6,391,305 and £6,412,419 respectively, a decrease in imports of £21,114 as compared with last year.

Disagreement on Sheet and Bar Wage Scales

At the conferences held last week at Atlantic City, N. J., between wage committees of the Amalgamated Association, Western Bar Iron Association and the sheet and tin plate mills that sign the Amalgamated scale, no settlement was reached. The puddlers asked for a flat advance of 75 cents a ton, which the manufacturers refused, while in the sheet and tin plate mills scales the manufacturers asked for some changes in the foot notes, which would reduce the earnings of the men and they also involve some changes in working conditions. Both conferences adjourned without settling a date for others. At present the outlook for an early settlement of any of the scales is not bright. On Tuesday, June 30, the sheet and tin plate mills that operate under the Amalgamated scale will shut down until a settlement is reached. The larger of these concerns are the American Rolling Mill Company, Middletown, Ohio, 21 sheet mills; Brier Hill Steel Company, Youngstown, Ohio, 20 mills; Follansbee Brothers Company, Follansbee, W. Va., four sheet mills and six tin mills.

Youngstown Sheet & Tube Company May Not Divide Profits

Reports that the Youngstown Sheet & Tube Company, Youngstown, Ohio, has definitely decided not to make a division of its profits with employees this year are premature. James A. Campbell, president of the company, has furnished us with a statement regarding this matter, as follows: "There has been no action as yet taken with reference to profit sharing with our employees and will not be until after June 30, which is the end of our fiscal year, when the statement for the year's business has been presented to our board of directors. As our business has been unprofitable during the last seven months, it is not likely that there will be any surplus left, after paying our regular dividends, to divide with our employees."

Pittsburgh and Nearby Districts

The McKeesport Tin Plate Company, McKeesport, Pa., now has 22 hot mills, consisting of a unit of 12 mills and one of 10 mills. It is proposed to increase the latter unit to 12 mills and also to build two new units of 8 mills each. The company would then have a total of 40 hot mills, making it the largest individual tin-plate plant in the world. No contracts have yet been placed, but it is expected that the building of the new mills will start shortly.

The Western Reserve Steel Company, recently organized, and which will erect a new sheet mill plant at Warren, Ohio, has elected officers as follows: C. S. Thomas, president; A. I. Thomas, vice-president; C. R. Thomas, treasurer; C. H. Lewis, secretary, and F. J. Thomas, general manager.

The Standard Steel Spring Company, Pittsburgh, has filed notice of an increase in its capital stock from \$5000 to \$200,000 and, it is said, contemplates the building of a plant in the Pittsburgh district. R. T. Russell is secretary.

The Jones & Laughlin Steel Company, Pittsburgh, through its subsidiary interest, the Woodlawn Land Company, has given a contract for the building of 40 houses for employees of its Aliquippa works at Woodlawn to the Wallis & Carley Company, Sharon, Pa. The houses will cost about \$90,000 and will be occupied largely by employees of the additional tin mills that are to be erected at Aliquippa.

In the endeavor to secure an absolute maximum of safety in its works, the Youngstown Sheet & Tube Company, Youngstown, Ohio, has forbidden its employees to bring reading matter into the mills, as reading is conducive to inattention to work on the part of employees and results in accidents. This has been more especially noticeable on the night shifts.

Contracts recently taken by W. N. Kratzer & Co., Pittsburgh, structural steel fabricators, include Feeble Minded Institute, Polk, Pa., 325 tons, and I. O. O. F. Temple, Oil City, 400 tons.

Corrigan, McKinney & Co., Cleveland, Ohio, have placed an order with the W. B. Pollock Company of Youngstown, Ohio, for 10 hot metal ladle cars for use between its blast furnaces and the new open-hearth steel works now being built.

The J. S. McCormick Company, Pittsburgh, manufacturer of foundry facings, supplies and equipments, has added a two-story office building and another story to its main works.

Customs Classification Decision

In passing upon the customs protest case of Rodden & Martin, of New York, the Board of United States General Appraisers lays down the principle that where in the tariff act an article is provided for by name in an unfinished state, its classification as such is not necessarily governed by the method, or the particular stage, of manufacture to which it has been advanced. As long as it has received its definite form or shape, however crude, and its ultimate use as such an article is clearly and permanently established, there can be no question as to its correct classification.

The specific merchandise responsible for the principle to govern importations, as announced by the board, was unpunched, unfinished scissors, sometimes called scissors forgings. They were intended to be ground down, punched, and manufactured into finished scissors. Duty was assessed under the provision in the tariff act for unfinished scissor blades, at the rate of 15c. per dozen and 15 per cent. ad valorem and at higher rates according to the value of the goods. It was claimed by the importers that the articles are properly dutiable at 30 per cent. as "forgings." The importers submitted much testimony in support of their contention, but Judge Fischer affirms the collector's classification after laying down the principle referred to above. The decision, if finally affirmed by the United States Court of Customs Appeals, will apply to a wide variety of imported merchandise, particularly metal articles in an unfinished state, but whose ultimate use is clearly indicated.

Cambria Steel Company Improvements

All Departments of Johnstown Works Being
Modernized and the Blast Furnaces Re-
built—Electricity Largely Replacing Steam

Under the administration of W. H. Donner as president of the Cambria Steel Company, Johnstown, Pa., and E. E. Slick, formerly of the Carnegie Steel Company, as general manager, the Cambria Steel Company has made some very important improvements and additions, which have allowed larger output in many departments and effected considerable saving in costs of manufacture. These betterments have extended to practically all parts of the plant. Some have been completed and others are still under way. A resume of the work done in the last year and a half follows:

MINING DEPARTMENT

Preliminary to complete electrification of the Rolling Mill coal mine, there has been installed at Mill Creek power house a 400-k.w. engine driven generator to supply current to a temporary pumping plant. Electrically driven pumps for a central pumping plant have been ordered; also a 300,000 cu. ft. capacity fan, which will be operated as an exhaust fan driven by a 500-h.p. motor. There will be two motors connected to this fan through couplings, one motor being disconnected and held in reserve. The permanent electric current will be supplied by a high tension line from Cambria power house, with rotary converter sub-stations at various points within the mine. When this work is finally completed it will permit abandonment of the Mill Creek air and steam power plant, except a sufficient number of boilers, which will be retained to furnish steam for the engine driving the 400-k.w. generator to insure a reserve current supply for the mine fan.

At No. 1 Franklin mine an additional 500-k.w. rotary converter has been ordered, together with feeder line and necessary electrically driven coal-cutting machinery. The coal from this mine will be delivered to the tippie by electric motors, dispensing entirely with air and mules. The ventilating fan at this mine will be driven by a 150-h.p. motor, displacing a steam engine.

First aid teams are trained at all of the mines and are equipped with modern safety apparatus.

ELECTRICAL EQUIPMENT

A 6000-k.w. turbo generator and self-contained surface condenser and accessories have been installed at the Cambria power house, which gives this station a rated output of 17,000-k.w. alternating current.

An extension to the second floor of the main building will be constructed for use as a switch gallery, and in the basement will be located a bab-bitt shop and an armature bake room.

Four 500-k.w. rotary converters have been ordered, two for the main power house, and one each for the sub-stations at the Gautier works and the 18-in. mill.

BLAST FURNACES

At the blast furnace plant furnaces Nos. 1 and 4 have been entirely rebuilt, furnace No. 2 was rebuilt with the exception of the columns and the shell, and furnace No. 3 is being demolished for complete rebuilding. A new system of down-comers and dustcatchers for each furnace was installed and a new cast and runner house con-

structed. The tracks around furnaces were rearranged and a slag granulating pit constructed, commanded by a crane runway with two 5-ton bucket cranes. The 16 hot blast stoves for these furnaces are being repaired, and when completed seven stoves will have been practically relined. These stoves will also be connected with a series of platforms and stairways. These furnaces were constructed with hearth of 16 ft. diameter, bosh of 21 ft. diameter and a height of 91 ft. from the hearth level to the charging floor. The pig casting plant was equipped with electric motors, displacing boilers and steam engines and modern controllers have been installed on the two ore bridges at these furnaces. The boilers in No. 3 boiler house are being equipped with new combustion chambers and piping and burners to permit of burning only furnace gas.

At Nos. 5 and 6 furnace plant, furnace No. 5 has been remodeled and repaired, and No. 6 furnace will shortly be taken off for similar work. No. 6 furnace will be equipped with four modern 24 x 100 ft. hot blast stoves, replacing four stoves of light construction. One of the old stoves will be retained and connected to No. 5 furnace, giving this furnace five stoves.

A slag conveyor is being constructed near the pig casting plant for making pan cake cinder.

Four horizontal cross compound steam blowing engines have been ordered from the Mesta Machine Company for engine houses at Nos. 1 to 6 furnaces. The engines are 48-in., 84-in., 84-in. and 84 x 60-in.

Three cinder ladle cars have been received and eight iron ladle cars are on order.

At Franklin furnace plant, furnace No. 7 was remodeled and repaired, and No. 8 furnace will shortly be taken off for similar work. A wet scrubber has been installed and the gas engine overhauled and repaired for service. A 400-ft. extension was made to the ore field, giving 250,000 tons additional capacity, which takes care of the ore requirements without stocking at the docks. Nos. 5, 6, 7 and 8 furnaces when remodeled will have 17 ft. hearth, 22 ft. bosh and 91 ft. height from hearth to charging floor.

OPEN HEARTH AND BESSEMER DEPARTMENTS

At the Cambria open-hearth plant, which has eight furnaces, the building has been re-roofed, the main runway columns strengthened and reinforced and steel bins erected on the charging floor, replacing wooden bins. A total of 220 charging boxes and 40 charging cars were put in service and water cooled dampers and rig installed for flues and dampers on No. 6 furnace.

At the Franklin open-hearth plant, which has 20 furnaces, 100 charging boxes were delivered, and a cobble shear installed in the stock yard. For furnishing gas to heat the ladles and for the receiver a gas line was laid from the gas holder at the coke plant. A drinking water line is being built to furnish cool water around the furnaces.

In the converter department three motor-driven pressure blowers are ordered for blowing the cupolas, displacing a blower house containing eight blowers and two steam engines. The scrap charging floor is being strengthened and chutes installed

at the converters to permit better charging of scrap and dispense with the use of steam for all heats which blow hot. The cupola building has been re-roofed, and an 1800-h.p. boiler house abandoned.

FINISHING MILLS AT THE CAMBRIA WORKS

The screw-downs on the 40-in. and 48-in. blooming mills were equipped with motor drive, displacing steam engines. The pit furnaces were lowered 42 in. together with the surrounding floor and the approach tracks were graded to enable handling more ingot cars per trip. Ventilators are being constructed on the building over the pit furnaces. The conveyor from the blooming mill to the rail mill was altered to permit of delivering steel to No. 4 mill, dispensing with loading blooms at the bloom shear and attending transportation in narrow gauge cars. The conveyor was also equipped with motor drive, dispensing with steam engines. At the blooming mill producer house mechanically operated coal and ash handling equipment has been installed.

A stationary table has been delivered for use between the 30-in. beam mill finishing stand and saw run and a set of lifting tables are now on order, which will completely equip this mill with new tables. A scale pit and drain have been constructed under the mill, and concrete paving laid in the engine room. The conveyors, roller runs and hot beds have been equipped with electric motors, dispensing with steam engines. One of the crane runways in the stock yard for this mill was extended to command a tie plate plant consisting of one repaired machine and two modern machines for punching and shearing tie plates.

At the rail mill a 42-in. sliding frame cold saw was installed, together with a 20-ton magnet traveling crane and runway for loading rails, displacing manual labor. No. 4 furnace was rebuilt and the hot saws, roller runs, hot beds and cambering rolls were equipped with electric motors, dispensing with steam engines. No. 1 hot bed is to be covered with a roof.

At the 18-in. mill a second 15-ton, 118 ft. span crane was installed over the hot bed.

No. 4 mill was equipped with electrically operated tables, replacing worn out equipment. Bloom and billet storage yard for Nos. 3, 4 and No. 2 9-in. mills commanded by two 10-ton traveling cranes is in service and replaces steam locomotive cranes and manual labor. A sorting, inspection and shipping bed has been constructed; also a 42-in. cold saw and roller run to permit of making direct shipments from this mill.

The 9-in. mill No. 2 was completely overhauled and equipped with repeaters, etc. A mechanical stoker was installed on the furnace and a shipping shed constructed to take care of the shipments from this mill.

FRANKLIN WORKS

Racks have been installed for storage of rolls and pinions at the 40-in. blooming mill and 34-in. slab mill, and the engine foundation for the 40-in. blooming mill straightened with binding.

GAUTIER DEPARTMENT

The 12-in. mill No. 2 has been put in service with considerable rearrangement. Repeaters were installed and lighter flywheels placed on the motor drive shafts.

On the No. 3 8-in. mill the 300-h.p. motor was replaced with a 500-h.p. motor and on the 10-in. train the 500-h.p. motor will be replaced with a 750-h.p. motor.

A 15-ton traveling crane was installed over No. 1 9-in. mill, and a 15-ton crane over No. 2 12-in. mill. Three stands of spare roll housings were also purchased for the 12-in. mill.

The No. 2 22-in. mill will be equipped with a vertical roll drive to permit of rolling edged bars, and the span of the crane over this mill will be increased to permit a crane to handle the finished product.

The 54-in. shear on the 24-in. mill has been equipped with back table and gauge.

The 13-in. mill is to be equipped with stationary lifting and transfer tables, also a shear and front and back table. The mill building was extended 48 ft. and a second traveling crane installed.

A bar mill is on order consisting of four stands of 10-in. continuous rolls, two stands of three-high 9-in. rolls and two stands of two-high 9-in. rolls complete with motor drive and accessories. The building and a 15-ton traveling crane for this mill are complete.

A general stock yard 336 ft. long has been provided, commanded by a 10-in. traveling crane, replacing manual labor for handling billets to and from trucks. Work is now going through the shops covering a 288-ft. extension to this runway.

A shipping warehouse has been constructed commanded by a 10-ton traveling crane. It is 450 ft. by 80 ft.

Work is progressing on a building to house a smith, machine and roll shops for the Gautier department. The existing machine tool, roll lathe and smith shop equipment will be moved to this building and the old tools equipped with individual motor drives. New tools have been purchased consisting of a 42-in. boring mill, 32-in. shaper, 6-ft. radial drill, 3 x 24-in. flat turret lathe and two 48-in. planers.

A general system of narrow-gauge tracks and trucks was put in service around these mills, replacing truck handling by manual labor.

Minor additions around this plant consist of automatic machine for cutting off short rounds for roller bearings, billet conveyor from furnace to 10-in. mill, replacing manual labor; two 4-ton hoists for 10-in. mill, No. 2 straightener for 14-in. mill and group motor drives in the disc plant, replacing steam engine.

STRUCTURAL AND STEEL CAR DEPARTMENT

Additional equipment for these shops cover two 1½-in. rivet headers, one 2-in. rivet head, 1½-in. nut tapping machine, 1¼-in. nut burring machine and 1½-in. roll threading machine for the bolt shop; 4-ft. radial drill and a 36-in. punch for the car shop. An extension to the car paint shops has been made to cover two tracks 620 ft. long. Blowers and stacks were installed in the forge shop, together with flue changes to improve the general draft system.

A 120-in. multiple side stake punch and 50-ft. Conley spacing table, including re-arrangement of tools in the car shop has been completed, together with the installation of two double axle lathes for the axle finishing shop.

A gantry crane at the structural shop has been equipped with 15-in. and 30-in. cantilever extensions to command more storage yard.

In order to increase the output of cars 150 per month, a 2100-ton press and furnace and 100-in. gate shear will be installed in the forge shop and the building extended one panel. The present forge shop yard is being roofed to cover the press and a new stock yard constructed, commanded by a 20-ton 80-ft. span crane.

COKE OVENS

The reconstruction of 100 ovens in batteries Nos. 3 and 4 has been completed and work is under way for reconstructing 60 ovens in batteries Nos. 1 and 2. The coal charge is $5\frac{1}{2}$ tons per oven. Battery No. 8 is completely rebuilt and the ovens increased in height about 27 in. The coal charge will be $8\frac{1}{2}$ tons per oven. Brick are being delivered for rebuilding No. 7 battery after the design of No. 8 battery. Battery No. 6 will be rebuilt early next year. Battery No. 5 was rebuilt and put in service in 1913 and is in good shape. The coal charge is $5\frac{1}{2}$ tons per oven.

A new battery of 50 coke ovens is under way, with additional by-product apparatus to be located in existing buildings. A quenching and loading station for this battery of ovens and batteries Nos. 1, 2, 3 and 4 will also be constructed. The coal charge will be $8\frac{1}{2}$ tons per oven. A motor-driven, float-controlled tar pump has been contracted for for No. 2 condensing house.

ROD AND WIRE MILLS

The furnaces, tanks, etc., have been rebuilt. In the bale tie room an additional automatic wire straightener has been installed, also three bale tie machines. In the annealing department two four-pot annealing furnaces are under construction. Four fence machines are going through the shops for the fence department, and a tank hoist and runway were constructed for coating field fence. The wire drawing benches have been equipped with 144 holders to permit the use of iron dies. Die reamers, drill presses and a grindstone were included for maintaining these dies. Runways and hoists were installed for handling the blocks on the wire drawing benches.

A building is being constructed for the storage of keg staves.

Cast-iron floor plates are being laid, replacing worn out wooden floors. Three hundred and seventy-five trucks are in service, replacing trucks too heavy for manual handling. Three storage-battery trucks for warehouse use and two cement coating rumpers for drum galvanizing nails.

The machine shop at this department is being furnished with a 14-in. x 35-in. lathe; 52-in. boring mill and a 200-ton wheel press.

CAMBRIA SHOPS

The machine shop has been furnished with a 72-in. and 60-in. gear cutter and the smith shop with a guillotine shear for stock yard. At the splice bar plant a heavy shear was installed for cold cutting splice bar stock. Two old roll lathes in the roll shop were equipped with modern head-stocks.

At the forge and axle department a steam forging press and boring lathe were installed and the heating furnace widened. At the 134-in. plate mill there was constructed a furnace and annealing tank for heat-treating axles. A duplex, crank pin, centering and cutting off machine and a double axle cutting off and centering machine have also been installed.

The transportation department has made general changes in the tracks of facilitate the movement of trains and have been furnished with 45 coke hopper cars and 50 composite cars.

A locomotive coaling station is under construction for coaling Cambria works locomotives, and an ash pit will be constructed under one of the cranes at the beam mill for cleaning locomotive grates.

Four thousand sling chains are in service for bundling billets, replacing wooden blocks when loading cars.

Two modern, suspension-bearing 150-ton track scales have been installed at the Cambria and Gauthier works. Magnets are attached to all cranes handling billets, etc.

A second story was added to one wing of the Cambria hospital for ward use. The lower floor is being fitted up for a dispensary.

Sheet Metal Contractors' Convention

The National Association of Sheet Metal Contractors held its annual convention in Cincinnati June 16 to 19. In the discussion a strong plea was made for closer cooperation with both jobbers and manufacturers. Attention was called to the fact that the association had taken no small part in inducing manufacturers to improve their products, an effort that has benefited greatly the manufacturer, contractor and the ultimate consumer. The entertainment programme jointly provided by the Cincinnati Sheet Metal Club, the Newport Rolling Mill Company and the American Rolling Mill Company, was very elaborate. On Tuesday, June 16, the plants of the Andrews Steel Company and Newport Rolling Mill Company were visited and the delegates were guests of the two companies at dinner. In the evening a vaudeville performance was given. A. L. Andrews, president; Frank A. Moeschl, general manager of sales, and William H. Wendel, assistant manager of sales, made speeches of welcome. On Friday the party was conveyed to Middletown on a special train, as guests of the American Rolling Mill Company, and after the inspection of the two plants a luncheon was served, followed by addresses by R. C. Phillips, secretary of the company, and R. H. Charls, manager of sales.

Paul F. Brandstedt, Washington, D. C., was elected president of the association. Denver has been selected as the place of the next convention.

Pig Iron Cost and Market Prices

"Of course it is a fact that for a season costs of iron may have nothing to do with prices," says Matthew Addy & Co.'s pig iron market letter, "but in the long run costs will govern prices, for iron cannot be sold indefinitely at a loss, as is now the case. When the very cheap [Southern] iron was made, of which Mr. Underwood spoke in Congress when he recently attempted to justify the present tariff, the base price for mining the thick Pratt coal was $37\frac{1}{2}$ cents. Gradually this price has advanced until it is now 55 cents; that is an advance of 40 per cent., all in labor costs. In all other directions the advance in the labor costs has been in about the same proportion. So Birmingham is in no shape to reproduce the low costs of 20 years ago. Unless labor suffers, pig iron prices in the end must be advanced to allow the iron manufacturers to live. At present labor is being paid high prices in the processes of iron manufacture, but the iron masters are not getting a return on their capital invested. One of the signs of the time is the steady reduction in furnace output."

In the description of the speed regulator for induction motors of the Allen-Bradley Company, which appeared in *The Iron Age* June 18, on page 1514, an error was made in describing the construction, it being stated that the regulator consisted of a series of carbon disks mounted on a rod in a steel tube. The disks are contained in a steel tube in which they move freely, but there is no rod through the center, the limited amount of play allowed the disks being relied upon to keep them from moving out of a plane where their upper and lower surfaces are at right angles to the axis of the tube.

The furnace of Joseph E. Thropp at Earlston, Pa., was blown out June 7. A considerable stock of iron has been accumulating. While the furnace is out repairs will be made, also some improvements at the limestone quarries and coal mines.

PIG-IRON LOSSES PERSIST

Poor Showing of Association Figures for the First Quarter

A meeting was held at Youngstown, Tuesday, June 23, of members of the American Pig Iron Association representing the central district of the country. Reports were made on recent developments in the pig iron trade, from which it appeared that stocks of pig iron have increased in the Central West. The indications are that a number of additions will be made to the list of idle furnaces in the next two weeks.

The secretary of the association, John A. Penton, of Cleveland, made the following report:

To the President, Executive Committee and Members:

In harmony with your request, for the purpose of completing our records, and in order to aid in making comparisons in the future, herewith is presented a brief synopsis of some of the business conditions as they exist among the members of our association, and affecting the merchant blast furnace industry of the country for the months of January, February and March, 1914.

To facilitate reviewing briefly the situation as it was during these months, some of the statistics compiled are given. In addition to this an average has been carefully made of the costs and selling prices during that period, taken from our records and compiled by the Croton Efficiency System, with which we are all familiar, and which has been utilized at all of our meetings for the preparation of the data distributed to the members of the association.

A 35 PER CENT. OPERATION

To begin with, the total capacity of all the furnaces of our members during these months combined was 2,929,800 tons, yet, owing to the condition of business and the consequent closing down of a very large percentage of the total capacity, there was made only 1,097,187 tons. The total number of workable furnaces belonging to the members of our association and north of the Ohio River is 110, and the average number in operation per month during these months was 65. The average number idle was 45.

The total cost of production varies somewhat in the different districts, and it is therefore only perhaps fair to use the data and estimates made by the Government and referred to in the report of your secretary made at the time of the general meeting of our association in New York City in April last. The Government gives the average bare furnace cost of all grades in all the territory north of the Ohio River at \$14.16 per ton in the report presented by Secretary Redfield to President Woodrow Wilson, as shown on page 87 and pages 541 to 566, inclusive.

Taking that figure as a basis, the total loss on all sales of iron made by our members during January, February and March amounted to \$1,883,964.94. And in the same way it is easily determined that the difference between the average price per ton of shipments and the Government's estimate of costs for those months amounted to \$1,235,517.18.

The total difference between the exact average price of the unfilled orders upon the books of all our members, as shown by the statistics in the possession of every member of the association and the Government's figures of cost, amounts, on the unfilled orders upon the books of our members April 1, 1914, to exactly \$1,539,071.82.

These figures could be carried further and made to show likewise the loss on the books from stocks on hand, valuing these stocks at the present market price, but it is unnecessary to make more discouraging a statement that in all its details is generally well known to every manufacturer of pig iron in the country. These data are compiled from the information that has been sent to each member, and anyone desiring any verification or explanation of any of these items can secure it easily by communicating with the office of the association.

SECOND QUARTER WORSE THAN FIRST

Fearful as the conditions were during the months of January, February and March, everyone here knows that if anything they have been much worse during the second quarter, namely, April, May and June, and are showing at this time no evidences of alteration for the better.

There have recently been sold some few large orders to large consumers, especially steel makers, where they have been in a position to make purchases for delivery in the distant future, in order to take advantage of the present low market price (with the hope that the iron would be used later), but no permanent improvement in the industry can be expected until the country returns to some normal measure of prosperity. After all, it is the consumption of foundry pig iron by foundry operators, large and small, that makes the market—and until that time comes there can be no profitable demand for the stocks now on hand or for the product of furnaces now idle or in blast.

There are in the United States just about 6000 foundries engaged in the manufacture of iron, steel and malleable castings. It is quite certain that these are not now operating at more than 50 per cent. of their capacity and the tendency is at this time to still further curtail production. It is fair to assume, therefore, that until conditions are such that confidence has become more or less fully restored in the future, iron sales will be at the minimum.

The figures for the second quarter of the year will be fully available toward the end of July and will be submitted to our members at that time.

A New Russian Iron and Steel Foundry

K. Rudzki & Son, of Warsaw, Russia, announce their intention to erect a steel and iron works in that country. The plant will consist of an iron foundry with a yearly output of about 11,500 tons of castings, two-thirds to consist of water collar and bowl pipes and the fittings, and one-third to be general machinery castings, such as transmission wheels, toothed wheels and special machinery for sugar and other mills. A steel foundry with an annual production of about 6600 tons is included, part of the output to be castings for hydraulic presses and part sundry steel castings. An open-hearth furnace of about 10 tons capacity will be erected. The new company is open for proposals and specifications.

Austin advices state that the Southwestern Steel Development Company, Texas City, Texas, which has a capital stock of \$30,000,000, has been financed in Belgium, according to a cablegram received from G. W. McIlhiney, president of the company, who has been abroad for some time promoting the project. It is said that the company will soon begin the construction of iron and steel works at Texas City, and that in connection with the enterprise it will develop on an extensive scale the iron ore fields of Cass County, Texas. The project was referred to in some detail in *The Iron Age* of October 30, 1913.

A bill has been introduced in Congress by Representative Alexander, chairman of the Committee on Merchant Marine and Fisheries, which if enacted into law will bring all the principal bulk carrying steamship lines on the Great Lakes under the direct supervision of the Interstate Commerce Commission. This bill is in accordance with an investigation of steamship combinations on the Great Lakes made by the committee and which was set forth at some length in *The Iron Age* on March 12 of this year.

The Western Reserve Steel Company, Warren, Ohio, which will shortly begin the erection of new sheet mills, has contracted with the Trumbull Public Service Company, Warren, for electric power for driving its entire plant.

The Machinery Markets

Reports indicative of widespread dullness in machinery lines come from most of the important cities and districts. Inquiries are few in New York; sales are small and they only follow the most earnest effort. New England is dull and there are conflicting opinions as to whether there has been any improvement at all. Business is light in Detroit, although there is some noteworthy demand for wood-working machinery. Extreme dullness exists in Cleveland, where manufacturers are not adding to their equipment, and the foundry trade has not improved. Trade is unsatisfactory in Cincinnati, also, both domestic and foreign orders being scattered. The dullness in Chicago has been accentuated by the absence of many machinery men at the railroad men's conventions at Atlantic City. In Milwaukee the export business is picking up, but domestic buying continues to be conservative. In the Central South machine tools are quiet, but the general machinery situation shows some improvement and second-hand electrical equipment is in good demand. In St. Louis inquiry is reported as being a shade better, with some requests for second-hand stock. The trade has been encouraged by more inquiry in the Birmingham district, but actual transactions are not large and improvement is slow. On the Pacific coast single machine tools are specified in most orders, but the general situation is somewhat better. Texas continues to call for irrigation pumping machinery.

New York

NEW YORK, June 24, 1914.

The state of the machinery trade is summed up in the following assertion made by a representative of a prominent firm which carries a large and good line: "We have to scratch mighty hard for what business we are getting and then it don't amount to much." The representative of another firm facetiously remarked that he almost had forgotten what an inquiry looked like. As a matter of fact, inquiries are about as few as orders and fear is expressed that there may not be much improvement before the end of summer. In the case of a company making pneumatic tools and doing a world business, the domestic business is admittedly slow, but its exports are good. Manufacturers up-state are still on part-time, though a few weeks ago there appeared to be a betterment in this respect.

O. R. Whitney, 39 Cortlandt street, New York, is in the market for one marine boiler, either new or second hand, 11 x 11 ft. or 10 x 12 ft., with about 1500 sq. ft. of heating surface, to give approximately 158 hp.

The Pratt & Letchworth Company, Buffalo, has let the contract for the erection of an annealing shop, 43 x 320 ft., one story, brick and steel construction, to be added to its plant at Tonawanda street and the New York Central railroad.

The H. B. Graves Company, Inc., Rochester, N. Y., has filed incorporation papers to manufacture and deal in furniture, etc. The capital stock of the company is \$400,000. H. B., E. L. and H. W. Graves are the incorporators.

The Batavia Sanitary Bed and Mattress Company, Batavia, N. Y., of which W. F. Bohm is president, will erect a two-story factory.

Armour & Co., Chicago, are having plans prepared for a fireproof concrete plant, to cost \$40,000, to be established at Rome, N. Y.

The J. F. Witmer Company, engineer, Dun Building, Buffalo, is preparing plans for a pumping plant for the water-works at Lyons, N. Y., and will advertise for bids about July 1. The estimated cost is \$140,000.

The Crocker plant of the American Agricultural Chemical Company, Buffalo, manufacturer of fertilizers, etc., was badly damaged by fire June 20. A five-story mixing building was destroyed and a four-story warehouse partially burned. The loss on buildings, machinery and stock was \$100,000. Rebuilding will be commenced at once.

C. H. A. Wannenwetsch Company, engineer, Buffalo, has completed plans for a packing house, 100 x 126 ft., to be built at Angola, Pa., by the United Home Dressed Meat Company, Angola. Contracts for erection have been let at a cost of \$60,000.

The Van Nostrand Mfg. Company, Dalton, N. Y., has been incorporated by G. M. Church, A. E. Holt and G. V. N. Smith, Buffalo. It will establish a plant for the manufacture of farm implements, motors and cutlery.

The Quaint Art Furniture, Syracuse, N. Y., has completed plans for a plant which it will build at East Syracuse, N. Y., at an estimated cost of \$60,000.

Lynn H. Baldwin, Utica, N. Y., has received the contract for the installation of an electric light plant at Unadilla Forks, N. Y.

The Utica Gas & Electric Company, Utica, will build a sub-station at Rome, N. Y., and has awarded the contract for the construction of the power house to Griffiths & Pierce, Rome, N. Y.

The Ralston Purina Company, St. Louis, Mo., has purchased from the Consolidated Milling Company the site of the Husted Milling plant at Prenatt street and the "Nickel Plate" Railroad, Buffalo. It will build a milling plant, comprising several buildings, including a grain elevator of reinforced concrete, having a capacity of 500,000 bu., and two mills, one having a capacity of 20 carloads per day and one of 50 carloads per week. The estimated cost of the plant is \$500,000.

New England

BOSTON, MASS., June 23, 1914.

The conditions in New England may have changed a little for the better, but if the attempt were made to prove the fact a vast variety of opinion and actual experience would be revealed. The situation is chaotic. The machine-tool trade is exceedingly dull. Some domestic business is being booked, in spots, and foreign orders are being received in a way to cause a real appreciation of what may be expected in dull times if this branch of trade is given proper attention when home demand is large.

The wire business of the New England territory shows little if any improvement. On the other hand, the textile machinery manufacturers, while dull in cotton lines, are exceedingly busy on orders for worsted and silk machinery. The leather trade, an important factor in this territory, is experiencing a much better feeling.

Work has begun on the extensions of the Coe Brass Company's plant of the American Brass Company, at Torrington, Conn. A group of three buildings will be erected, namely: An extension of the main factory, 62 x 200 ft., with an ell 30 x 36 ft., all two stories; an extension of the wire mill, 40 x 125 ft., four stories, and an addition to the tinning room, 45 x 92 ft., one story. The total cost will be about \$150,000.

Plans have been figured for an addition to the works of the A. H. Wells Company, Waterbury, Conn., manufacturer of copper and brass tubing, 70 x 90 ft., one story.

When the money is available, with the beginning of the Federal fiscal year, July 1, work will begin on the addition to the navy torpedo factory at Newport, R. I. The new machine shop will have about 35,000 sq. ft. of floor space, and will cost about \$260,000. It will be of brick and reinforced concrete. A storehouse will have 15,000 sq. ft. of space.

Philadelphia

PHILADELPHIA, PA., June 22, 1914.

The N. & G. Taylor Company, Chestnut and Third streets, Philadelphia, manufacturer of tin plate, has awarded contracts for a 100-ft. addition to its open-hearth plant at its Cumberland works. Contracts for the equipment have been awarded.

The Stahler Machine Company, Mt. Union, Pa., has been formed for the purpose of manufacturing rolling and crushing devices and certain agricultural implements, as well as doing a general foundry and machine shop business. It will specialize in the manufacture of iron castings. George R. Reynolds is president and general manager.

T. S. Pancoast, Third and Market streets, Camden, N. J., will build a two-story brick addition to his factory, 30 x 40 ft., to cost about \$6000. Borzner & Wood, 721 Walnut street, Philadelphia, are the architects.

Preparations are being made to rebuild the plant of the

Johnsonburg Machine Company, Johnsonburg, Pa., which was destroyed by fire two weeks ago with a loss of \$50,000. The buildings burned were the foundry, machine shop, pattern shop and the main office.

The plant of the Martin Lamp Black Company, Johnsonburg, Pa., was destroyed by fire June 19, entailing a loss of \$10,000 on building and machinery.

The Newhall Rolling Mills Company has been incorporated under Pennsylvania laws with a nominal capital of \$5000. The incorporators are David Newhall and Morton L. Newhall, Philadelphia, and Clarence C. Fell, New York.

The Baltimore Hub-Wheel Mfg. Company, Harford road and Baltimore & Ohio Railroad, has leased quarters on Holliday and Saratoga streets, Baltimore, Md., and will equip to manufacture carriage, wagon and automobile wheels.

The Turner Construction Company, 11 Broadway, New York City, has been awarded the general contract by the Standard Oil Company of New Jersey, Baltimore Division, for the construction of a reinforced concrete cooper shop, 80 x 100 ft., two stories and basement. Work will be begun at once.

Chicago

CHICAGO, ILL., June 22, 1914.

The conventions and exhibits at Atlantic City, N. J., last week drew heavily from among those interested in machinery at Chicago. The few transactions reported were accordingly of no great importance. Some routine inquiry and sales of a general character are reported, but this market is no exception to the general condition of business torpor.

The R. H. Lyon Company, Chicago, has been organized with a capital stock of \$2500 by Franc D. Mayer, 4946 Michigan avenue, Selma G. Mayer and Walter Herschman, for repairing, dealing in and selling automobiles.

The V. W. Bonham Pump Company, Chicago, has been organized with a capital stock of \$1000, to manufacture and deal in pumps. The incorporators are Benjamin Levering, 38 South Dearborn street, Thomas Stenhouse and Van Wey Bonham.

The Flex-Spring Company, Chicago, has been incorporated with a capital stock of \$5000, to manufacture and sell automobile parts and accessories, by Thomas R. Beman, Albert F. Mecklenburger and Ward B. Sawyer, 8 South Dearborn street.

Francis S. North, president of the Union Special Machine Company, Chicago, has purchased from the Newberry estate the property at 304 to 310 West Kinzie street, 80 x 100 ft., south front, for \$32,000. It is the intention of the new owner to improve the ground with a modern factory building.

The Chicago Aluminum Castings Company, 2647 Ogden avenue, Chicago, has had plans prepared for a one-story foundry to cost \$10,000.

The J. S. Wiley Company, Oklahoma City, Okla., has opened a new plant at Harvey, Ill., to make the same line of contractors' equipment that it has heretofore made at Oklahoma City. This plant is placed in operation to take care of the Eastern and Middle West territory. The Oklahoma plant will still be continued to supply the South and Southwest.

The Progressive Engineering Company, Peoria, Ill., has been organized with a capital stock of \$150,000, to manufacture and deal in machinery, etc. The incorporators are Clayton J. Ewing, George H. Beatty and William H. Webster.

The Illinois Central Railroad, 135 Park Row, Chicago, will spend \$700,000 for improvements at Clinton, Ill., which will include new and enlarged shop buildings, yards, a loop and additional side tracking.

The Bonner Tool Company, Champaign, Ill., has increased its capital stock from \$150,000 to \$700,000 and number of directors from seven to nine.

The Lyon Mfg. Company, Iowa Falls, Iowa, has been organized by W. E. Lyon, who is building a machine shop for jobbing and the manufacture of special devices. The company will be in the market for lathes, drill presses, shaper, miller, keyseater, smithing and small tools.

F. A. Masters, village clerk, Canton, Minn., will receive bids until 7.30 p. m., June 29, for constructing a waterworks system complete.

The Dean Iron Company, Duluth, Minn., has been incorporated with \$1,000,000 capital stock by John G. Williams, Arthur Howell and M. E. Riley.

The city of Aurora, Minn., has authorized the expenditure of \$35,000 for making extensions and improvements in the water system and enlarging the present lighting plant.

Indianapolis

INDIANAPOLIS, IND., June 22, 1914.

The Gates Mfg. Company, Indianapolis, has been incorporated with \$20,000 capital stock to manufacture automobile accessories, tops, seats, etc. The directors are F. E. Gates, R. A. Gates and F. O. Lane.

The General Machine Company, Ft. Wayne, Ind., has been incorporated with \$3000 capital stock to manufacture auto parts. The directors are Harry F. Smenner, C. W. Schane and Richard M. Vesey.

The Williams Machine & Mfg. Company, Vincennes, Ind., has been incorporated with a capital stock of \$10,000 by Henry M. Williams, J. Frank Whyte and Olla L. Williams. It will conduct a machine shop.

The city of Oakland City, Ind., is preparing to build a new pumping station at a cost of \$10,000.

Milwaukee

MILWAUKEE, WIS., June 22, 1914.

Business continues dull in all lines of machinery save the tool industry, in which rays of hope have come to builders by reason of improved demand. Export business is picking up somewhat but domestic buying indicates a continuance of utmost conservatism and for absolute needs only. A large share of business in electrical, pumping and special equipment comes from municipalities, private corporations engaged in public service withholding to an unusual extent. In Milwaukee and its immediate vicinity a few new industrial works are in process of construction which will require considerable tool and power equipment. On the whole, the situation is but slightly more encouraging.

The Hamilton-Beach Mfg. Company, Racine, Wis., manufacturer of electrical devices, has plans under way for a brick and steel factory, three stories, costing \$35,000. Work will start about July 10. Guilbert & Funston, Racine, are the architects.

The Wagner Architectural Iron Works, Milwaukee, Wis., will erect a shop, 70 x 100 ft., at a cost of \$9000. The new plant will be located on North Water street.

Cleveland

CLEVELAND, OHIO, June 22, 1914.

The machinery market is extremely dull and the trade does not look for an early improvement. Manufacturers generally are not adding to their equipment with the exception, of here and there a single tool made necessary in most cases by a change in their product. Business has slackened off with forge shops and other makers of automobile parts, due to the fact that this is between seasons in automobile production. A fair demand is observed for molding machines. Many foundries are apparently taking advantage of the dull times to make changes in their plants and to install new equipment. Conditions in foundry trade show no improvement.

The Electric Welding Products Company, Cleveland, will enlarge its plant by the erection of a one-story brick addition, 45 x 123 ft. The additional room will be used for the manufacture of tungsten and other high grade valves for automobile and stationary engines. Machine-tool equipment will be required for the building later.

The Standard Electric Stove Company, Toledo, Ohio, recently incorporated with a capital stock of \$100,000, will shortly begin the manufacture of a line of electric stoves. The company has taken over the plant of the Detroit-Fireless Stove Company and is in reality a reorganization of that company. A plant will be established in a four-story brick building at Jackson and Twelfth streets, formerly occupied by the National Biscuit Company. The officers are: Perry C. Tiedemann, president; S. L. Kelly, first vice-president and manager; Charles S. Turner, second vice-president; Luther Smith, secretary, and F. M. Bostater, treasurer. Mr. Smith has been identified with the stove manufacturing business for many years and was president of the Detroit Fireless Stove Company.

The Sterling Grinding Wheel Company, Tiffin, Ohio, is installing an entirely new outfit of machinery and fixtures in its elastic department. The company is now devoting nearly the entire second floor of one building to this work, giving the department about 5000 sq. ft. Several new ovens and presses will be included in the new equipment. The company has added to its foundry department the manufacture of brass, bronze and aluminum castings.

The Firestone Tire & Rubber Company, Akron, Ohio, has completed plans for the construction of two additions which will add 95,000 sq. ft. to its plant. One of the present wings, 60 ft. wide and five stories high, will be extended on the north

125 ft. Another extension of 125 ft. will be built on the south, 140 ft. wide. The original building was so arranged that the extensions can be built without any inconvenience to operations in the plant. A 4000-kw. generator and steam turbine will be installed to furnish the additional power needed and the present switchboard will be replaced by a gallery board, 70 ft. in length. The cycle tire department will occupy the new extensions.

Herbert W. Cole, manufacturer of trolley car accessories, with a factory at 1386 East Fortieth street, Cleveland, will build a new plant at 1623 East Forty-third street. The new building will be 28 x 80 ft., two stories.

The Sheriff Street Market & Storage Company, Cleveland, has awarded a contract for a large addition to its cold storage warehouse to the Tidewater Construction Company.

Detroit

DETROIT, MICH., June 22, 1914.

Conditions were more quiet in the local machine tool market the past week. The run of single tool orders was light and no transactions of importance were reported. Inquiries also are scarce for standard tools but there is some demand for wood-working equipment. Second-hand machinery is in light request. Machine shops generally report business as dull. The general industrial situation is fair. While most plants are working on a somewhat reduced schedule the outlook is better and few manufacturers look for further curtailment of output. Foundry conditions are unchanged. Building circles are active and contractors well engaged.

The R. A. Carmichael Company, Detroit, is erecting a new four-story factory at West Jefferson and Pleasant avenues. The company, which manufactures toilet specialties, has recently increased its capital stock to \$200,000.

The University of Detroit, Detroit, will in the near future erect a new engineering school to cost \$200,000. The school will embrace machine shops, a foundry, electrical laboratories and other departments and will be equipped with modern machinery throughout. The plans for the building are yet in the preliminary stage.

The Michigan Gear & Engineering Company, Detroit, has been organized by Robert Wilde and Arthur P. Emmert and will engage in the manufacture of gear-cutting tools and the gear-cutting business generally.

The new machine shop of the General Aluminum & Brass Mfg. Company, Detroit, Mich., instead of costing \$50,000, as stated in the issue of *The Iron Age* of June 11, will cost only \$10,000 or \$15,000.

The Massnick-Phipps-Mfg. Company, Detroit, Mich., will build a three-story brick and concrete factory, 60 x 247 ft. Mildner & Eisen, Detroit, are the architects.

The Buick Motor Company, Flint, Mich., is erecting a three-story building, 108 x 265 feet, for use as an enamel plant. It will house 15 ovens and a considerable amount of special equipment will be installed.

The Enterprise Brass Works, Muskegon Heights, Mich., is erecting an addition to its plant, 44 x 96 ft.

The Allory Steel Spring Company, Jackson, Mich., has been incorporated with \$100,000 capital stock to manufacture vehicle springs. The incorporators are Fred J. Keiser, Casper Harhule and A. E. Wurster.

The Perry Mfg. Company, Holly, Mich., has been incorporated with \$15,000 capital stock to manufacture barn equipment. Fred H. Perry and William Sheldon are the principal stockholders.

The taxpayers of Milford, Mich., have voted to bond for \$9000 for improvements to the waterworks.

The village of Saranac, Mich., has voted to bond for \$18,000 to provide for the construction of a municipal waterworks system.

The Superior Veneer & Cooperage Company, Munising, Mich., has acquired additional timber holdings and will double the capacity of its plant.

Stroud, Bridge & Connors, Bay City, Mich., are making plans for a two-story factory, 90 x 110 ft., which will be devoted to the manufacture of automobile accessories.

The Lakeside Foundry Company, Detroit, Mich., has bought the foundry equipment of the bankrupt R-C-H Corporation and will place it in operation, specializing in cylinders and cylinder parts.

Cincinnati

CINCINNATI, OHIO, June 22, 1914.

A number of local manufacturers have been very much interested in the convention of the National Association of Sheet Metal Contractors, held here last week. This is es-

pecially so with manufacturers of portable electric drilling and grinding machines, as it is comparatively only a short time ago when this particular field began to be considered profitable to work. The recent convention convinced many that the demand for these small tools will increase rapidly.

The machine tool trade continues unsatisfactory, although a few scattered domestic and foreign orders are coming along, with lathes probably in better demand than any other kind of machines. Wood-working machinery is also slow, but some improvement is seen in the demand for small motors and generators. No change is reported by second-hand machinery dealers, and only a small amount of business is being done, with no particular line favored.

The Early & Daniel Company, Cincinnati, has had plans prepared for a mill and grain elevator building to be constructed at Sixth and Car streets. The proposed structure will be 56 x 75 ft., 90 ft. high, and of reinforced concrete construction. Considerable special milling equipment will be required, as well as grain elevators.

The Cocoran Brothers Company, Cincinnati, manufacturer of automobile lamps and other specialties, has acquired a site adjoining its present plant, on which it will construct an addition. Plans have not yet been made up.

The Roche-Bruner Building Company, Cincinnati, has secured the contract for an addition to the plant of the Andrew Jergens Company, soap manufacturer. The proposed structure will be 100 x 120 ft., four stories, and of reinforced concrete construction.

The Ohio Electrolytic Oxygen Company, Cincinnati, has been incorporated with \$200,000 capital stock for the manufacture of oxygen and hydrogen. B. L. Heldingsfeld, Union Trust Building, is one of the incorporators. It is understood that manufacturing plans have not yet been completed.

The Star Foundry Company, Covington, Ky., contemplates making an addition to its plant that will be 64 x 75 ft., one story, and of brick construction.

Tolbert Brothers, Middletown, Ohio, contemplate the reconstruction of their plant recently destroyed by fire that entailed a loss of \$50,000. The firm manufactures buggies and carriages and lost much valuable wood-working and other machinery.

It is currently reported that E. L. Shuey, Dayton, Ohio, is having plans prepared for a large power building to be erected at Springfield, Ohio.

The Gebhart Milling Company, Dayton, Ohio, will rebuild its plant recently destroyed by fire. No machinery requirement details are yet available.

The Carrollton Pottery Company, Carrollton, Ohio, announces that it will rebuild its plant that was destroyed by fire last week.

The Breece Mfg. Company, Portsmouth, Ohio, has tentative plans under way for enlarging its furniture factory.

The H. D. Beach Company, Coshocton, Ohio, manufacturer of metal specialties, expects to enlarge its plant at an early date. A planing mill will also probably be operated in connection with the company's plant.

Birmingham

BIRMINGHAM, ALA., June 22, 1914.

The machinery trade has been encouraged by inquiries from all round, but actual transactions have not been on a large scale. Improvement is slow. The construction of cotton-seed oil mills, ice and fertilizer plants and structural activity in the Birmingham district call for a variety of goods, respectable in the aggregate volume.

The Consolidated Engineering Company, Birmingham, will build the \$75,000 roundhouse of the Southern Railway in the Finley yards at North Birmingham, now being established at a total cost of \$1,500,000.

The Birmingham Railway, Light & Power Company, Birmingham, has ordered the plans for improvements totaling \$65,000.

Jerome H. Sheip, Inc., Philadelphia, expects to begin the manufacture of cigar-box material in the plant under construction at Mobile by August 1. It represents an investment of \$100,000.

The Eufaula Cotton Oil Company, Eufaula, Ala., has been incorporated with a capital stock of \$30,000 to manufacture cotton-seed oil, etc. H. H. Connors, and others, are interested.

The Columbus Power Company, Columbus, Ga., will install an additional 5000-kw. unit at Goatrock station. Stone & Webster, Boston, Mass., are the engineers. Several contracts have been awarded to the General Electric Company, Allis-Chalmers Mfg. Company, and others.

The Cotton States Feed & Fertilizer Company, Macon, Ga., has been organized with a capital stock of \$200,000, by Joel

Hurt, G. F. Hart, and others, of Atlanta, Ga. It has acquired the Riverside Fertilizer plant and will erect a cotton-seed oil mill.

N. A. Alexander, 381 Washington street, Dublin, Ga., is in the market for a second-hand bending machine; also a pin and bracket machine.

Wrenn Columbia Furniture Company, High Point, N. C., is in the market for a second-hand 26-in. or 30-in. Whitney double surfacer, divided roll; also a rebuilt or second-hand Smith endless bed, 42-in. sander.

The City of Wake Forest, N. C., J. L. Bullard, superintendent of the light plant, will purchase an automatic engine, 125 hp. for direct-connected generators, 276 r.p.m., 100-lb. steam pressure; f.o.b. cars Wake Forest.

The Central South

LOUISVILLE, Ky., June 22, 1914.

The general machinery situation is showing improvement. This is particularly true of boilers, a large amount of important building work making a market for boilers for heating purposes. Complaint is heard, however, that competition for business is so keen that prices are being cut to the bone. Machine tools are quiet, but electrical equipment is moving fairly well. There is a strong demand for second-hand motors, a number of large installations having been taken care of recently by the purchase of used machines. Mill supply houses report that the volume of business is increasing, indicating that manufacturing operations generally are closer to normal than they have been for some time.

The Louisville board of education is putting steam heating plants in many public school buildings which heretofore have been without heating equipment of that kind. Bids will be received until June 24 on several boilers. J. Earl Henry is the architect and engineer of the board.

The A. F. McArthur Mfg. Company, 909 Starks Building, Louisville, which was recently organized in Louisville, will erect a building and install machine tools and other equipment for the manufacture of smoke consumers.

The Purified Petroleum Products Company, Louisville Trust Building, Louisville, is having plans drawn for a two-story factory of corrugated steel construction. The equipment will consist of a 20-hp. motor, pumps, and special apparatus. G. A. Shaw should be addressed.

The plant of the Ohio Falls Motor Car Company, New Albany, Ind., has been taken over by a new company known as the Hercules Motor Car Company. No changes are to be made at present, but it is expected to enlarge the factory considerably later on. C. H. Lambert is president.

The Louisville Coopers Company, which it was reported would establish mills near Whitesburg, Ky., advises that the mills are to be removed from other locations and that no new equipment will be needed.

The Patterson Sand Company, 2615 Crop street, Louisville, is in the market for an electric hoist, a motor and a drum and wire cable. The equipment is to be used in handling sand-wagons.

The Foreman & Gresham Automobile Company, Paducah, Ky., is planning to equip a repair shop and will need a motor, machine tools, etc.

The Lancaster Parquet Flooring Company, Brooklyn, N. Y., will build a plant in Paducah, Ky. Wood-working and power machinery will be purchased. C. W. Craig, secretary of the board of trade, has detailed information.

George H. Greenup, Burkesville, Ky., plans to establish water and electric light plants at once.

The Eagle Casting Company, Winchester, Ky., has gone out of business, and its equipment has been purchased by James Love, Lexington, Ky. He has not decided whether or not he will operate the plant.

The Union Redrying Company, Lexington, Ky., has increased its capital stock from \$20,000 to \$100,000 and will increase the capacity of its tobacco plant. This will make additional boiler capacity necessary.

The City Council, Tell City, Ind., has approved a bond issue of \$17,000 for the purpose of improving the municipal electric light plant. New machinery will be installed.

The Louisa Water & Improvement Company, Louisa, Ky., will equip a pumping station at once and is reported in the market for the necessary machinery.

The Roberts & Schaefer Company, McCormick Building, Chicago, has the contract for the construction of two coal tipples for the W. G. Duncan Coal Company, Greenville, Ky. Conveying and power equipment will be needed in that connection.

H. H. Fraser, B. G. McKenzie, Dayton, Tenn., and others, are organizing a company to operate a cotton gin, for which boilers and other equipment will be needed.

The city of Lawrenceburg, Tenn., has decided to improve the pumping station of its water plant and will be in the market shortly for a motor-driven pump. The mayor may be addressed.

The Fair Foundry Company, Knoxville, Tenn., has taken over the Dixie Stove & Mfg. Company, of that city, and will merge the two plants. The Fair Foundry Company has increased its capital stock from \$20,000 to \$25,000. J. E. Fair is president and treasurer.

Barker & Tarbin, Columbia, Tenn., are planning the establishment of a cold storage plant at Chattanooga, Tenn. The Chattanooga board of trade is assisting in the location of the industry.

The Holston Valley Railway, Bristol, Tenn., plans electrification. A power plant will probably be erected at Bristol.

The C. Lee Cook Mfg. Company, Louisville, Ky., manufacturer of metallic rods and valve stem packing, etc., is in the market for the following equipment, all to be second-hand and in first-class condition: One 300-hp. or 200-hp. water tube boiler, capable of 150 lb. steam pressure; two standard two-stage modern high-duty air compressors with 700 ft. free air capacity; one duplex 800-gal. fire pump; one 10 to 15-kw. direct current generator set, either 110 or 220 volts; the latter preferred, direct connected to engine; one standard gauge saddle tank locomotive, capable of 140 lb. steam pressure, with about 12-in. cylinders; one 600-hp. wet vacuum pump, duplex and flywheel type preferred; one standard gauge locomotive crane with approximately a 30-ft. boom and 10-ton capacity.

The mayor and aldermen, Johnson City, Tenn., will receive bids until June 27 for equipment for the manual training room, including about six lathes, hand saw, jointer and work benches and six down draft forges.

St. Louis

ST. LOUIS, Mo., June 22, 1914.

While there has been an accession of optimism in this market which has not lost ground since it began a week or two ago, there has not been any large increase in the business actually transacted. Nevertheless, the machine-tool dealers are getting into closer touch with industries which are considering plans for extension and also those which contemplate new establishments in the coming few months. As a result they report that the outlook is brighter for a resumption of business along normal lines than has been the case at any time since the recent depression set in. No large lists have as yet appeared, but there is a shade better buying of single tools and there is a little request for second-hand equipment. Collections are reported by the dealers to be in satisfactory condition and there are other evidences that there will be ample funds for extension and new operations should the situation develop to a point seeming to justify the ventures.

The Hammar Brothers White Lead Company, St. Louis, has increased its capital stock from \$500,000 to \$650,000 for the purpose of extending its operations.

The Champion Motor Car Company, St. Louis, has been organized with a capital stock of \$50,000, to do a general motor vehicle and machinery business. R. Walton, O. A. Peters and F. D. McMahon are the incorporators.

The Girtanner-Davies Engineering & Contracting Company, St. Louis, has been incorporated with a capital stock of \$40,000 by Frank Girtanner, J. A. Davies and Alexander Girtanner, and will equip for the manufacture of boilers, furnaces, etc.

The Weigrefe Planing Mill, East St. Louis, Ill., was destroyed by fire June 12 with a loss of \$60,000, largely on equipment, which, it is announced, will be replaced.

The city of Butler, Mo., has voted \$75,000 in bonds which will be utilized in equipping a water plant or the acquisition of the existing private plant which will be remodeled, requiring machinery.

The Art Crafts Engraving Company, St. Joseph, Mo., has been incorporated with a capital stock of \$15,000 by H. A. Markle, W. H. Guenther and Leslie Forgrave, and is reported in the market for routers, planers and other mechanical equipment.

The Seven Cities Company, Russellville, Ark., has increased its capital stock from \$200,000 to \$500,000 for the purpose of extending its holding and constructing additional public service electric plants in Arkansas cities.

The city of Kahoka, Mo., will expend about \$11,000 on

new equipment for its public service electric light plant. Bonds therefor have been voted.

The Commercial Club, Columbia, Mo., in negotiation with W. J. Delaney, Frank Kidd and J. B. Trescott, of St. Louis, and F. S. Mordaunt, Chicago, have about completed arrangements for the construction and equipment of an electric line with power house, etc., to serve nearby territory.

The Prescott & Northwestern Railroad, Prescott, Ark., will rebuild its machine shop which was recently burned. New equipment will be installed.

Additional pumping capacity will be installed at Bridge Junction, Ark., not a post office, by the Standard Oil Company, 26 Broadway, New York.

The Ouachita Power Company, Little Rock, Ark., of which D. L. Phillips is manager, has plans for a plant at Hot Springs, Ark., and is reported ready to proceed with the construction and equipment work, about 7000 hp. and an expenditure of \$500,000 being involved.

The city of Benton, Ark., will install a waterworks and a sewage disposal plant. The preliminary work is in charge of the mayor.

The town trustees of McLoud, Okla., are receiving bids for the construction and equipment of an electric light service. T. T. Cook, town clerk, should be addressed.

The city of Grandfield, Okla., has completed plans for the expenditure of about \$11,000 for a waterworks equipment, including pump, to be added to the present plant. The mayor is in charge.

The installation of a waterworks plant is to be made at New Wilson, Okla., by S. P. Brimer, and others.

The Denver-Miami Milling Company, Miami, Okla., has been incorporated with a capital stock of \$80,000 by W. J. L. Crank and C. A. West, and others, and will equip a flour, feed and meal mill plant.

The Oklahoma Brick, Tile & Stone Company, Oklahoma City, Okla., has been incorporated with a capital stock of \$25,000 by J. A. Witbanks and G. E. James, of Norman, Okla., and H. B. Featherstone, Blanchard, Okla., and will build a plant.

The Minter City Oil Company, Minter City, Miss., will remodel and increase the equipment of the Gulfport Oil & Fertilizer Company, Gulfport, Miss.

Waterworks are to be installed at Brandon, Miss., by a syndicate in which S. L. McLaurin, and others, are interested. They are in the market for the necessary equipment.

The city of Flora, Miss., C. L. Holloway superintendent of plant, will receive bids until July 1 for waterworks equipment, including a pump of 250 gal. per min. capacity, etc.

J. E. Glisson, Abita Springs, La., is reported in the market for water power and special machinery.

A plant for the manufacture of silos will be equipped at Alexandria, La., by the J. L. Jones Mfg. Company, Kansas City, Mo.

The St. Tammany Lumber Mfg. Company, Ramsay, La., will receive bids for the construction and equipment of a plant with a capacity of 100,000 ft. daily. About \$30,000 of equipment will be installed.

The Percival Concrete Tie & Socket Company, Queen and Crescent Building, New Orleans, La., has been incorporated with a capital stock of \$50,000 by H. E. Percival, J. E. Bluck, and others, to manufacture concrete railway ties.

Texas

AUSTIN, TEXAS, June 20, 1914.

The commercial bodies of several cities and towns of Texas are making energetic efforts to secure new manufacturing enterprises for their respective communities. The most notable feature of the machinery trade at present is the large demand for irrigation pumping machinery. Pumping plants are being put in all through the southern and western portions of the State. Crop conditions are much improved over what they were two or three weeks ago.

The Dayton Light & Power Company, Dayton, has been organized for the purpose of constructing an electric light and power plant.

The City Council, Nogales, Ariz., has granted a franchise to Spiro Proto and Monte Mansfield for the construction of an electric light and power plant in that city.

Bonds in the sum of \$14,000 have been voted by the taxpayers of Milford for the construction of a waterworks plant, etc.

The Brazos River Irrigation Company, Abilene, will construct a large system of irrigation near that place. The project involves the installation of pumping plants.

The municipal waterworks plant of Groesbeck will be enlarged and otherwise improved.

The Crystal Ice Company, Sulphur Springs, will install additional machinery in its ice-making plant.

The South Texas Cotton Oil Company, Houston, has increased its capital stock from \$60,000 to \$125,000 and will make improvements to its cotton-seed oil mill.

The Webster Cotton Oil Company, Ennis, has been organized for the purpose of constructing a cotton-seed oil mill. J. T. Webster, Sr., is interested.

The Moran Oil Company, Haskell, will build a cotton-seed oil mill. It has a capital stock of \$40,000. Henry Johnson is interested.

The Walker Products Company, Austin, will put in a pumping plant to irrigate more than 1200 acres of land.

A. M. Loomis, El Paso, and associates, will construct an irrigation pumping plant to irrigate 11,454 acres of land.

J. C. Short, Saragosa, is preparing to irrigate 640 acres and will install a pumping plant.

The San Antonio Water Supply Company, San Antonio, is preparing to construct a water pumping station to cost about \$200,000. N. J. Harding is chief engineer. Plans have also been made for other improvements in the way of additional machinery that will add about 20,000,000 gal. to the daily pumping capacity.

The Southwestern General Electric Company, Dallas, has increased its capital stock from \$350,000 to \$600,000. It will make improvements to its property.

The Farmers' Canal Company, Blessing, will construct an irrigation pumping plant.

The Nueces Valley Irrigation Company, Carrizo Springs, will construct a pumping plant to water 10,000 acres of land.

The electric light plant of the Taft Gin & Oil Company, Sinton, which was recently destroyed by fire, will be rebuilt.

San Francisco

SAN FRANCISCO, CAL., June 18, 1914.

The general situation looks somewhat better. There is a good steady demand for implements, small motors, gas engines, etc., in the country, with some belated orders for canneries and packing house equipment. Occasional inquiries are appearing for heavy machinery for irrigation. Orders for mining machinery are fairly numerous, and sawmill machinery, though not active, is doing better than a month ago. Inquiries for contractors' supplies are still widely scattered, but gradually increasing, and the outlook for heavy construction work has improved greatly. As for machine tools, business is confined mostly to single-tool orders from garages and small shops. Salesmen are putting forth all possible efforts, and there is considerable tentative figuring, but it seems impossible to close sales of any consequence; and much further improvement will evidently be necessary in miscellaneous lines before the effect can reach the tool department. Collections are slow, but a good many buyers are meeting their obligations more promptly, and money is becoming more readily available for industrial and development purposes.

The Desert Irrigation Pump Company, Globe, Ariz., has been incorporated with a capital stock of \$200,000, by L. L. Henry, John R. Williams, and others, for the purpose of manufacturing pumps, etc.

The Pittsburgh Foundry Company, Los Angeles, has purchased a site and is having plans drawn for a new plant.

The Yuba Construction Company, Marysville, Cal., is preparing to build an addition to its plant to take care of the traction engine business.

It is announced that the Llewellyn Iron Works, Los Angeles, will start work shortly on its new plant at Torrance, Cal., and that the Acme Brass Foundry will build a plant at the same place.

The Reed Zinc Company, Ravenswood, Cal., is preparing to enlarge its plant.

The Simonds Machinery Company, whose San Francisco plant was recently burned, has established new headquarters at 117 New Montgomery street.

The American Trona Corporation is completing plans for its large plant at Searles Lake, Cal., for the manufacture of potash and chemicals.

The Union Tool Company, Los Angeles, has filed notice of an increase of its capital stock from \$1,200,000 to \$2,500,000.

The Tulare Power Company, Lindsay, Cal., is financing a plan to increase its steam plant and install a new hydro-electric plant on Tule River.

The Pacific Northwest

SEATTLE, WASH., June 16, 1914.

The Snoqualmie Falls Lumber Company, Seattle, capitalized at \$3,000,000, has been organized by the Grandin Coast Lumber Company and the Weyerhaeuser interests to handle millions of feet of lumber owned by the respective concerns in the Snoqualmie district. The erection of a mammoth sawmill to cost approximately \$1,000,000 will be commenced before September 1. The incorporators are George S. Long, Tacoma; O. D. Fisher, Seattle, and W. D. McCormick. John P. Weyerhaeuser and G. W. Grandin are designated as trustees.

The Vittrified Cement Machine Works, Everett, Wash., has recently been formed, with a capital stock of \$100,000. Christopher Westgard and George McKenzie are incorporators, with J. Y. Kennedy, Colby Building, attorney.

The plant of the Northwest Sash & Door Company, Portland, Ore., was destroyed by fire recently, entailing a loss of more than \$150,000. The company will rebuild at once on a larger scale.

H. H. Clivvord, Rainier, Ore., has leased a site on the Necanicum River, on which he will erect a shingle mill having a capacity of 200,000 shingles per day.

Richard H. Clow, Mapleton, Ore., will at once begin construction of an electric power plant.

The Aumsville Flour Mills Company, Aumsville, Ore., will shortly begin the construction of an electric light and power plant.

The port commission of Seattle, Wash., has practically completed plans for the seven-story cold storage warehouse to be erected at the east waterway, at a cost of approximately \$500,000, and bids will be called for about August 1.

Eastern Canada

TORONTO, ONT., June 20, 1914.

E. C. Hedman, New Castle, N. B., has started the manufacture of weights and scales. It is the intention to form a company and erect a factory.

The Johnson Motor Car Company, Ft. Erie, Ont., proposes to erect an auto factory.

The American Good Roads Machinery Company, Goderich, Ont., will make additions to its factory at a cost of about \$90,000.

The McColl Brothers, Don esplanade, Toronto, manufacturer of lubricants, etc., will erect a plant at Harriston, Ont., to replace the plant recently destroyed by fire.

J. R. Eaton & Sons, Ltd., Orillia, Ont., will erect a wood-working factory at a cost of \$100,000.

The Niagara Grain & Feed Company, Port Colborne, Ont., will erect a plant to cost \$200,000.

The Christie Lime Company, Speedville, Ont., will erect a three-story addition to its factory.

The Crystal Ice Makers, Toronto, Ont., will erect a plant for the manufacture of ice.

The Canada Furniture Mfg. Company, Woodstock, Ont., will build a four-story addition to its factory to cost \$15,000.

The Toilet Laundry Company, Montreal, will erect a boiler house.

Henry Morgan & Co., Ltd., Montreal, Que., will erect a factory to cost between \$600,000 and \$1,000,000.

It is announced that the city of Montreal will erect a municipal electric plant to maintain 500 lamps for central districts. The expenditure is placed at \$172,667.

J. A. King & Co., Ltd., Montreal, has been incorporated with a capital stock of \$150,000 by O. B. MacCallum, J. L. Finlay, J. H. Wilkie, and others, to manufacture fireproof and other building material, etc.

The Atlas Shipping Company, Ltd., Montreal, has been incorporated with a capital stock of \$250,000 by E. W. Howard, Jacob DeWitt, H. C. McNeil, and others, to build ships.

The Uxbridge Piano Company, Ltd., Uxbridge, Ont., has been incorporated with a capital stock of \$300,000 by A. E. Soulis, A. C. Osborne, A. E. Miller, and others, to manufacture pianos and other musical instruments.

The British Canadian Film Company, Ltd., Toronto, Ont., has been incorporated with a capital stock of \$40,000 by James Aitchison, Duncan McArthur, and others.

The Georgian Bay Navigation Company, Ltd., Owen Sound, Ont., has been incorporated with a capital stock of \$40,000 by M. D. Lemon, H. W. Lemon, and others, to manufacture and build ships and docks.

The Canadian-Detroit Steel Products, Ltd., Windsor, Ont., has been incorporated with a capital stock of \$40,000 by Harry C. Bulkley, Samuel K. Pittman, John G. Rumney, and others, to manufacture iron, steel and other metal products.

The Wallaceburg Lumber Company, Ltd., Wallaceburg, Ont., has been incorporated with a capital stock of \$40,000 by D. A. Gordon, D. D. Gordon, and others, to manufacture lumber.

The St. Canut Land, Power & Quarry Company, Ltd., Montreal, has been incorporated with a capital stock of \$49,000 by Felix Barriere, and others, to generate electricity, etc.

The Consumers' Lumber & Box Company, Grimsby, Ont., was damaged by fire to the extent of \$25,000. Over \$7000 worth of new machinery, installed within the past few days, was destroyed.

The sash and door factory of Jasmin & Cantin, Cartierville, Que., was destroyed by fire, involving considerable machinery. The loss is estimated at \$20,000.

The ratepayers of Orillia, Ont., passed a by-law to grant \$85,000 for the installation of a filtration plant.

The Fibre Boxes, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by T. H. Goldring, J. T. Loftus, J. A. Milne, and others, to manufacture machinery and other material used in the manufacture of boxes, and to manufacture boxes, cartons, etc.

The Reliance Moulding Company, Richmond street, West, Toronto, is erecting a factory at Kingston, Ont., and will move its plant there. It manufactures picture moulding, curtain poles, etc.

The Interprovincial Brick Company of Canada, Ltd., Good-year Building, Toronto, is erecting a pressed brick plant at Cheltenham, Ont.

The Canada Last Company, Toronto, has plans prepared for the erection of a factory on Van Horne street, for the manufacture of lasts, shoe-trees, hosiery darners, etc.

Western Canada

WINNIPEG, MAN., June 19, 1914.

Demand for machinery is picking up rather slowly. Business generally is somewhat quieter than leading authorities predicted a few weeks ago. There seems to be a tendency to go forward on new propositions cautiously, and this is in a measure attributed to the general conservatism in practically all classes of business throughout western Canada. It is confidently expected that the assurance of a good crop this year will be followed by greater activity all around. Municipalities are spending considerable amounts of money on various kinds of improvements, but the railroad companies and private concerns are not carrying on as much work as in previous corresponding seasons. A few new plants, of course, are being erected in the different centers of western Canada, and a good deal of machinery is being used in repairs to factories, mills, etc. It is stated that English capital for investment in this part of Canada is coming in disappointingly slowly.

The Yellowhead Coal & Coke Company, Ltd., Edson, Alta., headed by M. J. O'Brien, Montreal, Que., will spend \$500,000 in developing the property, according to report.

The Vancouver Lumber Company, Ltd., Vancouver, B. C., will add two new boilers to the power plant.

The Stewart Sheaf Loader Company, Ltd., Winnipeg, is preparing to erect a branch factory at Grand Forks, N. D. John S. Menzies, Winnipeg, is the general manager.

The Oribio Mfg. Company, 233 Spadina avenue, Winnipeg, has taken out a permit for the erection of a steel product factory.

By-laws authorizing extensions to the electric lighting and waterworks systems, at a cost of \$90,000, have been passed by the ratepayers of Redcliffe, Alta.

J. W. Vipond, Nanaimo, B. C., and associates, are planning to erect a large sawmill on Big Lake, Wellington district, B. C.

The Heaps Engineering Company, Ltd., New Westminster, B. C., is about to proceed with the completion of its machine shop and foundry on Lulu Island, B. C.

The Interior Hardwood Finishing Company, Ltd., Duncan, B. C., is proceeding with the erection of a factory. Branches will be built at Victoria and Vancouver.

The James Brooks Woodworking Company, Ltd., New Westminster, B. C., has decided to build a mill at East Burnaby, B. C.

The Pacific Lime Company, Ltd., Vancouver, B. C., is about to install a sawmill of 35,000 ft. daily capacity for the cutting of barrel stock.

The Wasser-Mouatt Lumber & Shingle Company, Edmonds, Wash., plans the erection of a shingle mill of six machines.

The McLaren Lumber Company, Blairmore, Alta., will erect a mill to cost \$200,000.

The Munderloh Glass Company is erecting a plant at Medicine Hat, Alta., to cost \$200,000. It will manufacture plate glass under a new process.

Huston & Hanley, Medicine Hat, Alta., are erecting a planing mill. The building will be 30 by 70 ft., of brick construction, and will be equipped with a Bessemer gas engine, planing and finishing machinery, to cost \$8000.

The Ornamental Iron Works, Medicine Hat, Alta., is making additions to its plant. The main building of the plant is being raised one story, which will increase the capacity of the plant one third.

James Leigh & Son, Victoria, B. C., are building a sash and door factory.

The Sunset Bag Company, Winnipeg, will build a \$100,000 plant this year.

The Prince Rupert Lumber Company, Winnipeg, Man., has been incorporated with a capital stock of \$100,000 by E. A. Ronantz, R. P. Ward, and others, to manufacture lumber, etc.

The Central Forge, Ltd., Saskatoon, Sask., has been incorporated with a capital stock of \$20,000.

The St. Mungo Canning Company, New Westminster, B. C., is erecting a building 75 by 132 ft., to be used as a cold storage plant, to cost \$40,000.

The Dominion Government will build a large elevator at Vancouver, B. C., to cost between \$750,000 and \$1,000,000.

The Regina Sash & Door Company, Ltd., Regina, Sask., has been incorporated with a capital stock of \$20,000, to manufacture lumber, etc.

I. A. Welk and J. J. Nickel, Rostern, Sask., are having plans drawn for the erection of a flour mill with a capacity of 1000 bbl. per day.

The elevator of the Maple Leaf Milling Company, Lockwood, Sask., was destroyed by fire.

Bids will be received by P. J. Stephens, secretary of the town of Estevan, Sask., for the following: Two 250-kw., 2300-volt 3-phase 60-cycle alternating current generators direct-connected to engine, and two exciters, one 500-kw. 2300-volt 3-phase 60-cycle alternating current generator direct-connected to engine, and exciter, three producer gas engines, complete with generators, etc. Further particulars can be obtained from S. G. Dethridge, town electrical engineer, Estevan, Sask.

The ratepayers of Port Coquitlam, B. C., have passed a by-law for \$100,000 to be raised for a steel works.

The ratepayers of Saskatoon, Sask., have passed a by-law to grant \$215,000 for a site for and the erection of a power plant.

Government Purchases

WASHINGTON, D. C., June 22, 1914.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until 11 a.m., July 11, for furnishing and installing four 100-hp. water-tube boilers, one fan, etc., for the United States Naval Hospital, Las Animas, Colo., and for furnishing and installing one after-cooler, complete, for the Portsmouth Navy Yard.

Bids will be received at the office of the commissioners of the District of Columbia, Washington, room 509, District Building, until 2 p.m., July 14, for furnishing and delivering electrically operated centrifugal sewage pumps. Specifications may be obtained from the purchasing officer, room 320, District Building.

The general purchasing officer of the Panama Canal, Washington, will call for bids under Canal circular No. 858, for furnishing one motor-driven, double-spindle wood-working shaper, with four bench and two stand type wood trimmers. The dates of opening will be determined later.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until July 14, schedule 6942, for one self-contained plain grinding machine, 144-in. between centers, for work up to 20-in. in diameter, and two bench milling machines, both for Washington; schedule 6943, one lubricating oil testing outfit complete with electric motor, heating device, etc., for Brooklyn; until July 28, schedule 6968, one universal bench saw complete with motor; schedule 6969, one motor-driven slip roll forming machine, 14 single feed horizontal pumps and one motor-driven four-plunger hydraulic pump, all for Mare Island.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, on June 16 for furnishing supplies for the navy yards, as follows:

Schedule 6782, Steam Engineering

Class 31, Puget Sound—One 40-ton bridge crane—Bid 41, \$11,090 and \$10,690; 115, \$11,658; 129, \$10,520 and \$9860; 138, \$11,500; 182, \$11,250 and \$10,850; 195, \$10,290. Alternate—Same, f.o.b. works—Bid 41, \$9590 and \$9190; 115, \$9483; 129, \$8580 and \$7930; 138, \$9700; 195, \$8686.

Class 32, Puget Sound—One 15-ton bridge crane—Bid 41, \$6145 and \$5730; 115, \$6455; 129, \$6235 and \$5625; 138, \$6850; 182, \$7350 and \$6950; 195, \$6494.

Alternate—Same, f.o.b. works—Bid 41, \$5695 and \$5280; 115, \$5655; 129, \$5325 and \$4725; 138, \$5950; 195, \$5816.

Schedule 6783, Steam Engineering

Class 33, Mare Island—One lathe—Bid 82, \$1358, \$1258, \$1215, \$1097 and \$997; 115, \$1155, \$1110, \$1085, \$1050, \$1005, \$975, \$945, \$775, \$750, \$700 and \$670; 129, \$1208 and \$1152; 141, \$1423; 147, \$1237, \$1142, \$1271 and \$1110; 197, \$1365; 206, \$1033, \$1044 and \$1086; 209, \$995 and \$1100.

Alternate—Same, f.o.b. works—Bid 63, \$1076; 72, \$993 and \$1037; 82, \$1266, \$1182, \$1119, \$1014 and \$930; 98, \$666; 115, \$1100, \$1058, \$1030, \$1000, \$955, \$925, \$895, \$725, \$700, \$650 and \$620; 129, \$1135 and \$1079; 130, \$999 and \$959; 141, \$1332; 147, \$1165, \$1070, \$1199 and \$1038; 156, \$1146; 197, \$1130; 205, \$639; 206, \$943, \$954 and \$996; 209, \$948 and \$1053.

Schedule 6818, Steam Engineering

Class 181, Norfolk—One vertical spruce-cutting machine—Bid 24, \$1225; 115, \$1223; 130, \$1224; 179, \$973.50; 187, \$940; 209, \$1250, \$820 and \$575.

Schedule 6833, Steam Engineering

Class 261, Portsmouth—One punching and forming press—Bid 24, \$960 and \$870; 115, \$535 and \$495; 130, \$530 and \$503; 145, \$679; 157, \$470; 163, \$850; 179, \$615 and \$647; 209, \$760.

Schedule 6834, Steam Engineering

Class 263, Norfolk—Two milling machines—Bid 86, \$2844.79; 129, \$2095.

Class 264, Norfolk—One 30-in. lathe—Bid 89, \$4937 and \$4772; 98, \$3700, \$3550, \$3618, \$3338 and \$3475; 129, \$4240 and \$3980.

Class 265, Norfolk—One combination bar and chucking lathe—Bid 69, \$3300; 98, \$4305, \$4280, \$4211.50 and \$4130.

The names of the bidders and the number under which they appear in the above list are as follows:

24, E. W. Bliss Company; 41, Cleveland Crane & Engineering Company; 63, Fairbanks Company; 69, Gisholt Machine Company; 72, Garvin Machine Company; 82, Harron, Rickard & McCone; 86, Ingersoll Milling Machine Company; 89, I. H. Johnson, Jr., & Co., Inc.; 98, Kemp Machinery Company; 115, Manning, Maxwell & Moore; 129, Niles-Bement-Pond Company; 130, D. Nast Machinery Company; 138, Pawling & Harnischfeger Company; 141, Pratt & Whitney Company; 145, Prentiss Tool & Supply Company; 147, Pacific Tool & Supply Company; 156, Springfield Machine Tool Company; 157, D. H. Stoll Company, Inc.; 163, Standard Machinery Company; 179, Toledo Machine Tool Company; 182, Toledo Bridge & Crane Company; 187, Vulcan Engineering Sales Company; 195, Whiting Foundry Equipment Company; 197, Fred Ward & Son, Inc.; 205, Federal Sales & Service Company; 206, Frevert Machinery Company; 209, F. A. Branda & Co.

Water Gas Producers for Steel

Water gas in producing steel is reported as being successfully used by the Torgauer Company, Torgau, Germany, which is running a 15-ton basic furnace by this means for pouring steel castings. The gas producing plant is of the Dellwik-Fleischer type and consists of two producers of 26,500 to 35,300 cu. ft. capacity per hour. The plant is operated by one workman and assistant, who is the stoker. Blast furnace or gas coke are used with nearly equal results. An average of 460 cu. ft. of gas per minute is consumed which, for an output of 14 tons in 5 hours, equals a fuel consumption of 14 per cent. assuming that 70 cu. ft. of gas is obtained from 1 kg or 2.2 lb. of coke.

The employees in the locomotive shop of the Reading Railway Company at Reading, Pa., are working 45 hours a week and the car shop employees 55 hours, many cars being under repair. The Pennsylvania Railroad's Juniata shops at Altoona, Pa., have been put on 55 hours a week. For some time they have been working 45 hours a week. The output of locomotives is to be increased from 10 to 15 a month.

